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THE ASSESSMENT AND PREDICTION OF RIFLE SQUAD EFFECTIVENESS

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PRB TECHNICAL RESEARCH NOTE 31
THE ASSESSMENT AND PREDICTION OF
RIFLE SQUAD EFFECTIVENESS

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NOVEMBER 1954

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BRIEF

THE ASSESSMENT AND PREDICTION OF RIFLE SQUAD EFFECTIVENESS

THIS RESEARCH IS PART OF A LONG-RANGE STUDY OF SMALL-UNIT EFFECTIVENESS AND OF THE FACTORS WHICH DETERMINE IT. IN A PREVIOUS STUDY, A DAYLIGHT BLANK FIRING FIELD PROBLEM WAS DEVELOPED FOR INFANTRY RIFLE SQUADS. IN THE PRESENT STUDY, A DAYLIGHT LIVE FIRING FIELD PROBLEM AND A NIGHT BLANK FIRING FIELD PROBLEM WERE DEVELOPED TO COMPLETE A COMPREHENSIVE SET OF CRITERION FIELD PROBLEMS FOR USE IN ASSESSING COMBAT READINESS AND FOR RESEARCH PURPOSES IN VALIDATING SELECTION AND ASSIGNMENT PROCEDURES. THESE FIELD PROBLEMS WERE DEVELOPED BY THE COMBINED EFFORTS OF MILITARY AND TECHNICAL EXPERTS.

THE PROBLEMS WERE FIELD TESTED WITH 112 9-MAN RIFLE SQUADS. CRITERION SCORES ON EACH PROBLEM WERE DERIVED FOR THE SQUAD LEADERS, THE SQUAD MEMBERS, AND FOR THE TOTAL SQUAD. THE AGREEMENT AMONG THE UMPIRES SCORING EACH PROBLEM WAS FOUND TO BE VERY HIGH. THOUGH THE DAYLIGHT BLANK FIRING PROBLEM AND THE NIGHT BLANK FIRING PROBLEM WERE MORE RELATED TO EACH OTHER THAN EITHER WAS TO THE DAYLIGHT LIVE FIRING PROBLEM, EACH FIELD PROBLEM MADE A REASONABLY INDEPENDENT CONTRIBUTION TO THE COMPOSITE SCORE ON UNIT EFFECTIVENESS. THE FIELD PROBLEMS CAN BE USED AS CRITERIA FOR VALIDATING POTENTIAL SQUAD SELECTORS AND AS OPERATIONAL MEASURES OF SQUAD EFFECTIVENESS.

TO EXPLORE THE POTENTIAL USEFULNESS OF MEASURES OF ABILITY, PERSONALITY TRAITS, AND INTERPERSONAL RELATIONS IN SELECTING LEADERS AND MEMBERS OF SQUADS OR IN BETTER UNDERSTANDING HOW SQUADS OPERATE, MEASURES OF 58 VARIABLES WERE ALSO ADMINISTERED TO THE 112 SQUADS. SIGNIFICANT VALIDITY COEFFICIENTS WERE FOUND FOR SELECTION MEASURES OF GENERAL MENTAL ABILITY, SPECIFIC APTITUDES, AND NONCOGNITIVE PERSONALITY CHARACTERISTICS SIMILAR TO THOSE ALREADY IN USE IN THE ARMY'S SELECTION AND CLASSIFICATION SYSTEM. THE SUCCESSFUL PREDICTORS WERE USUALLY MEASURES OF THE SQUAD LEADER. INTERPERSONAL MEASURES FOUND TO BE INDICATIVE OF GROUP EFFECTIVENESS WERE GROUP MEASURES OF ABILITY TO ANTICIPATE THE BEHAVIOR OF OTHER SQUAD MEMBERS, THE DEGREE TO WHICH THE SQUAD LEADER FULFILLS THE ROLE EXPECTED OF HIM BY HIS SQUAD MEMBERS, THE NUMBER OF MEMBERS NOMINATED BY THE SQUAD FOR AN IDEAL RIFLE SQUAD, AND AGREEMENT BETWEEN OWN PREFERENCE AND PERCEIVED PREFERENCE OF THE SQUAD.

PREDICTIVE MEASURES OF THE SQUAD LEADER CONTRIBUTED MOST TO THE PREDICTION OF SQUAD EFFECTIVENESS. SINCE THE EFFECTIVENESS OF THE SQUADS WAS LARGELY A FUNCTION OF THE EFFECTIVENESS OF THE SQUAD LEADERS, EFFICIENT SELECTION OF SQUAD LEADERS IS A MOST IMPORTANT CONSIDERATION IN ORGANIZING EFFECTIVE SQUADS.

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CHAPTER I

INTRODUCTION

IT HAS BECOME COMMONPLACE TO SAY THAT THE SUCCESS OF AN ARMY IS A DIRECT FUNCTION OF THE ABILITY OF ITS SMALL UNITS TO WORK EFFECTIVELY. THE NEED FOR EFFECTIVE TEAMWORK IN SMALL UNITS HAS BEEN STRESSED BY MANY MILITARY WRITERS (14, 15, 16, 29, 53, 54). THE PERSONNEL RESEARCH BRANCH OF THE ADJUTANT GENERAL'S OFFICE RECOGNIZED THE NEED FOR RESEARCH ON SMALL UNIT EFFECTIVENESS SEVERAL YEARS AGO. THERE WAS INITIATED IN 1950 A SERIES OF CONTRACT STUDIES, FIRST WITH THE INSTITUTE FOR RESEARCH IN HUMAN RELATIONS AND LATER WITH PSYCHOLOGICAL RESEARCH ASSOCIATES, AIMED AT DEVELOPING METHODS FOR ASSESSING THE COMBAT READINESS OR EFFECTIVENESS OF SMALL UNITS. THE INITIAL WORK (29) WAS CARRIED OUT WITH THE SCOUT SQUAD OF AN ARMORED CAVALRY REGIMENT. LATER WORK (53, 54) WAS DONE WITH THE INFANTRY RIFLE SQUAD. THE EMPHASIS WAS ON THE DEVELOPMENT OF VALID, RELIABLE, AND REALISTIC MEASURES OF SQUAD EFFECTIVENESS WHICH COULD BE USED AS CRITERIA FOR THE EVALUATION OF SELECTION PROCEDURES AND CLASSIFICATION TECHNIQUES. NATURALLY MANY BY-PRODUCTS, PARTICULARLY IN THE AREA OF TRAINING, RESULTED. THIS EARLIER RESEARCH RESULTED IN THE DEVELOPMENT OF A DAYLIGHT BLANK FIRING FIELD PROBLEM AS A CRITERION OF RIFLE SQUAD EFFECTIVENESS. ADMINISTRATION OF THIS PROBLEM AND OF PREDICTOR INSTRUMENTS TO 100 RIFLE SQUADS MADE IT POSSIBLE TO ISOLATE CERTAIN FACTORS WHICH APPEARED TO BE RELATED TO THE OPERATIONAL READINESS OF RIFLE SQUADS. IN ADDITION, PRINCIPLES OF SMALL UNIT TEST CONSTRUCTION WERE SYSTEMATIZED, AND THEIR APPLICATION IN FURTHER DEVELOPMENT OF PERFORMANCE TESTS WAS POINTED OUT.

THIS RESEARCH STUDY IS AN EXTENSION OF THE INITIAL WORK. ITS OBJECTIVES WERE:

1. TO DEVELOP DAYLIGHT LIVE FIRING AND NIGHT FIELD PROBLEMS FOR THE INFANTRY RIFLE SQUAD TO SUPPLEMENT THE SIX-HOUR DAYLIGHT BLANK FIRING PROBLEM DEVELOPED IN THE PRIOR STUDY (53, 54). THIS RESEARCH WAS REQUESTED BY THE COMMANDANT OF THE INFANTRY SCHOOL, BRIG. GENERAL G. S. MELOY (17). THESE PROBLEMS WERE TO PROVIDE A MORE COMPREHENSIVE TEST OF THE COMBAT READINESS OF INFANTRY RIFLE SQUADS. IN ADDITION, MANUALS FOR ADMINISTERING AND UMPIRING THE LIVE AMMUNITION AND NIGHT PROBLEMS WERE TO BE DEVELOPED.

2. TO STUDY FACTORS UNDERLYING COMBAT READINESS BY DEVELOPING A CONCEPTUAL FRAMEWORK TO EXPLAIN HOW SMALL MILITARY UNITS OPERATE, TO ANALYZE THIS FRAMEWORK INTO SPECIFIC PREDICTORS, AND TO VALIDATE THESE PREDICTORS AGAINST THE CRITERION SCORES. IT WAS FELT THAT SUCCESSFUL PREDICTORS COULD BE USED FOR SELECTION, CLASSIFICATION, AND RELATED PURPOSES.

THIS RESEARCH NOTE OUTLINES THE PROCEDURES FOLLOWED IN DEVELOPING CRITERIA AND PREDICTORS AND IN ADMINISTERING THESE MEASURES TO RIFLE SQUADS OF THE 44TH INFANTRY DIVISION AT FORT LEWIS, WASHINGTON, DURING THE SUMMER OF 1954.

ONE SPECIFIC PROBLEM IN CRITERION RESEARCH OF THIS TYPE IS THE DIFFICULTY FREQUENTLY ENCOUNTERED IN OBTAINING INTEGRAL UNITS OR SQUADS. INTEGRALITY IS HERE USED TO CHARACTERIZE SQUADS WHICH CONTAIN MEN WHO HAVE HAD SUFFICIENT OPPORTUNITY, THROUGH WORKING AND TRAINING TOGETHER, TO WORK EFFECTIVELY IN THE FIELD AS A SQUAD TEAM. TO INSURE THAT SQUADS TESTED IN THIS RESEARCH WERE INTEGRAL, THE 44TH INFANTRY DIVISION WAS ORDERED BY THE DEPARTMENT OF THE ARMY TO FREEZE THE COMPOSITION OF SIX T/O AND E RIFLE SQUADS FROM EACH RIFLE COMPANY AT LEAST FOUR WEEKS PRIOR TO TESTING. THE

IMPLEMENTATION OF THIS ORDER PROVIDED 162 SQUADS. ONE HUNDRED AND TWELVE OF THESE SQUADS, WHICH APPEARED TO BE MOST INTEGRAL, ON THE BASIS OF A PRELIMINARY CHECK WITH PARENT COMPANIES, WERE TESTED. IN ADDITION, SQUAD INTEGRALITY WAS CHECKED FURTHER BY A QUESTIONNAIRE TO ALL SQUADS TO DETERMINE HOW LONG THEY HAD BEEN TOGETHER. IT WAS FOUND THAT ALL SQUADS CONSISTED OF MEN WHO HAD BEEN TOGETHER FOR ONE MONTH OR LONGER, THAT THE AVERAGE SQUAD CONSISTED OF MEN MOST OF WHOM HAD WORKED TOGETHER FIVE TO SIX MONTHS. IT WAS FELT, THEREFORE, THAT THE COOPERATION OF THE DIVISION TO ASSURE THAT THE SQUADS TESTED WERE INTEGRAL PROVIDED AN OPPORTUNITY FOR A REALISTIC EVALUATION OF THOSE PREDICTOR INSTRUMENTS WHICH MIGHT BE AFFECTED BY INTEGRALITY.

CHAPTER II

DEVELOPMENT OF CRITERIA OF FIELD PERFORMANCE

A. OBJECTIVES OF FIELD TEST DEVELOPMENT

THIS CHAPTER REVIEWS THE PROCEDURES FOLLOWED IN DEVELOPING THE COMBAT READINESS CRITERIA USED IN THIS STUDY. THE DAYLIGHT BLANK FIRING PROBLEM, DEVELOPED IN 1952, WAS AVAILABLE FOR USE. THE METHODS USED IN DEVELOPING THE DAYLIGHT LIVE AND NIGHT BLANK FIRING PROBLEMS FOLLOWED PROCEDURES ALREADY REPORTED IN PREVIOUS CRITERION DEVELOPMENT RESEARCH (SEE ESPECIALLY 29, 53).

THE FIELD PROBLEMS DEVELOPED ARE CALLED TESTS OF COMBAT READINESS BECAUSE THEY ATTEMPT TO MEASURE THOSE SKILLS WHICH ARE BELIEVED TO BE NECESSARY FOR COMBAT EFFECTIVENESS. THE OBJECTIVES IN DEVELOPING SUCH TESTS ARE:

1. TO IDENTIFY AND DESCRIBE THE IMPORTANT COMBAT DUTIES OF A UNIT.
2. TO SELECT COMBAT MISSIONS AND TO PLAN AGGRESSOR AND TARGET ACTIONS SO THAT THESE DUTIES CAN BE PERFORMED AND EVALUATED UNDER STANDARDIZED CONDITIONS.

IN CONSTRUCTING THESE TESTS, REQUIREMENTS OF VALIDITY, STANDARDIZATION (INTER-UMPIRE AGREEMENT), AND PRACTICALITY MUST BE MET:

1. VALIDITY. THE SQUAD ACTIONS CALLED FOR IN THE FIELD PROBLEM MUST REPRESENT THOSE DUTIES WHICH DIFFERENTIATE BETWEEN GOOD AND POOR SQUADS IN COMBAT.
2. STANDARDIZATION. STANDARDIZATION IS ACHIEVED BY MAKING MISSION REQUIREMENTS SIMILAR FOR ALL SQUADS, BY PROVIDING THE SAME TEST CONDITIONS FOR ALL SQUADS, AND BY INTENSIVE TRAINING OF UMPIRES. WHEN TESTS ARE EFFECTIVELY STANDARDIZED, SQUAD SCORES CAN BE MEANINGFULLY COMPARED.

3. INTER-UMPIRE AGREEMENT. FOR A FIELD TEST TO BE EFFECTIVE, SCORES MUST BE INDICATIVE OF PERFORMANCE, NOT UMPIRE BIASES. UMPIRES MUST BE CONTINUOUSLY AND INTENSIVELY TRAINED SO THAT THEY USE THE SAME FRAME OF REFERENCE IN MAKING RATINGS. THE FACTORS TO BE RATED MUST BE DESCRIBED IN SUCH A MANNER THAT THE UMPIRE HAS OPPORTUNITY TO OBSERVE AND RATE OBJECTIVELY.

4. PRACTICALITY. CRITERION PROBLEMS MUST BE SUITABLE FOR ADMINISTRATION AT AN OPERATING ARMY INSTALLATION BY ARMY PERSONNEL AND ON TERRAIN AVAILABLE ON MOST ARMY RESERVATIONS. THEY MUST NOT MAKE EXCESSIVE DEMANDS ON OPERATIONAL UNITS FOR PERSONNEL OR MATERIEL.

B. DEVELOPMENTAL STEPS

THE STEPS IN DEVELOPING THE DAYLIGHT BLANK FIRING,¹ DAYLIGHT LIVE FIRING, AND NIGHT PROBLEMS FOR THIS STUDY WERE:²

STEP 1: COLLECTION AND CLASSIFICATION OF CRITICAL COMBAT DUTIES

BACKGROUND MATERIALS WERE GATHERED BY INTERVIEWS AND LIBRARY RESEARCH. FIELD MANUAL MATERIAL, MOS DUTIES AND QUALIFICATIONS, AND COMBAT INCIDENTS WERE COLLECTED AND CLASSIFIED. THIS STEP WAS TAKEN TO MAKE SURE THAT THE TESTS INCLUDED DUTIES WHICH ARE CRITICAL IN COMBAT. AS A RESULT OF THIS RESEARCH AND ANALYSIS, IT APPEARED THAT THE PRIMARY DUTIES OF THE RIFLE SQUAD COULD BE CLASSIFIED INTO ESSENTIALLY THREE TYPES OF ACTIVITY:

1. ATTACK. ACTION TAKEN TO SEIZE GROUND AND TO KILL, CAPTURE, OR DESTROY THE ENEMY,

2. DEFENSE. ACTION TAKEN TO HOLD GROUND OR MATERIEL.

¹ AS STATED EARLIER, THE DAYLIGHT BLANK FIRING PROBLEM WAS DEVELOPED IN 1952. SINCE THE SAME PROCEDURE WAS USED FOR EACH OF THE THREE PROBLEMS, THEIR DEVELOPMENT IS DISCUSSED TOGETHER.

² FOR A MORE DETAILED DISCUSSION, SEE 53.

3. INVESTIGATION OR RECONNAISSANCE. ACTION TAKEN TO GAIN KNOWLEDGE ABOUT ENEMY ACTIVITY.

STEP 2: CONSTRUCTING THE FIELD PROBLEMS

A LIST OF CRITICAL SQUAD DUTIES WAS PREPARED FOR EACH OF THE THREE CRITERION FIELD TESTS. FOUR PHASES, OR MISSIONS, WERE DEVELOPED FOR THE DAYLIGHT BLANK FIRING PROBLEM, THREE FOR THE DAYLIGHT LIVE FIRING PROBLEM, AND ONE FOR THE NIGHT BLANK FIRING PROBLEM. A SCENARIO AS WELL AS JOB DESCRIPTIONS WERE PREPARED FOR EACH FIELD PROBLEM MISSION. THE SCENARIO SPECIFIED, IN CHRONOLOGICAL SEQUENCE, WHAT SITUATIONS THE SQUAD WAS TO MEET. JOB DESCRIPTIONS SPECIFIED WHAT THE SQUAD SHOULD DO WHEN IT ENCOUNTERED THE SITUATIONS DESCRIBED IN THE SCENARIO. CRITICAL COMBAT DUTIES WERE INCORPORATED INTO THE JOB DESCRIPTIONS AND THE SCENARIO REQUIRED THE SQUAD TO PERFORM THESE DUTIES.

STEP 3: REVIEW BY EXPERTS

THE SCENARIOS AND JOB DESCRIPTIONS WERE REVIEWED BY COMMITTEES OF THE INFANTRY SCHOOL. SUGGESTED CHANGES WERE INCORPORATED.

STEP 4: RATING ITEMS

RATING ITEMS WERE PREPARED FROM THE REVISED JOB DESCRIPTIONS. MAKING USE OF PAST EXPERIENCE IN CONSTRUCTING AND ANALYZING ITEMS DESCRIPTIVE OF FIELD PERFORMANCE, AN ATTEMPT WAS MADE TO WRITE ITEMS THAT WOULD BE OBJECTIVE, UNAMBIGUOUS, AND DESCRIPTIVE OF OBSERVABLE BEHAVIOR.

STEP 5: FIELD PROBLEM PRETEST

THE FIELD PROBLEMS WERE PRETESTED TO ASSURE THAT RATING ITEMS ACCURATELY DESCRIBED THE BEHAVIOR TO BE OBSERVED. CHECKS WERE MADE TO ASSURE THAT THE PROBLEMS PROVIDED THE SQUAD AN OPPORTUNITY TO EXECUTE ALL DUTIES DESCRIBED

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IN CONSTRUCTING THESE TESTS, REQUIREMENTS OF VALIDITY, STANDARDIZATION (INTER-UMPIRE AGREEMENT), AND PRACTICALITY MUST BE MET:

1. VALIDITY. THE SQUAD ACTIONS CALLED FOR IN THE FIELD PROBLEM MUST REPRESENT THOSE DUTIES WHICH DIFFERENTIATE BETWEEN GOOD AND POOR SQUADS IN COMBAT.

2. STANDARDIZATION. STANDARDIZATION IS ACHIEVED BY MAKING MISSION REQUIREMENTS SIMILAR FOR ALL SQUADS, BY PROVIDING THE SAME TEST CONDITIONS FOR ALL SQUADS, AND BY INTENSIVE TRAINING OF UMPIRES. WHEN TESTS ARE EFFECTIVELY STANDARDIZED, SQUAD SCORES CAN BE MEANINGFULLY COMPARED.

3. INTER-UMPIRE AGREEMENT. FOR A FIELD TEST TO BE EFFECTIVE, SCORES MUST BE INDICATIVE OF PERFORMANCE, NOT UMPIRE BIASES. UMPIRES MUST BE CONTINUOUSLY AND INTENSIVELY TRAINED SO THAT THEY USE THE SAME FRAME OF REFERENCE IN MAKING RATINGS. THE FACTORS TO BE RATED MUST BE DESCRIBED IN SUCH A MANNER THAT THE UMPIRE HAS OPPORTUNITY TO OBSERVE AND RATE OBJECTIVELY.

4. PRACTICALITY. CRITERION PROBLEMS MUST BE SUITABLE FOR ADMINISTRATION AT AN OPERATING ARMY INSTALLATION BY ARMY PERSONNEL AND ON TERRAIN AVAILABLE ON MOST ARMY RESERVATIONS. THEY MUST NOT MAKE EXCESSIVE DEMANDS ON OPERATIONAL UNITS FOR PERSONNEL OR MATERIEL.

B. DEVELOPMENTAL STEPS

THE STEPS IN DEVELOPING THE DAYLIGHT BLANK FIRING,¹ DAYLIGHT LIVE FIRING, AND NIGHT PROBLEMS FOR THIS STUDY WERE:²

STEP 1: COLLECTION AND CLASSIFICATION OF CRITICAL COMBAT DUTIES

BACKGROUND MATERIALS WERE GATHERED BY INTERVIEWS AND LIBRARY RESEARCH. FIELD MANUAL MATERIAL, MOS DUTIES AND QUALIFICATIONS, AND COMBAT INCIDENTS WERE COLLECTED AND CLASSIFIED. THIS STEP WAS TAKEN TO MAKE SURE THAT THE TESTS INCLUDED DUTIES WHICH ARE CRITICAL IN COMBAT. AS A RESULT OF THIS RESEARCH AND ANALYSIS, IT APPEARED THAT THE PRIMARY DUTIES OF THE RIFLE SQUAD COULD BE CLASSIFIED INTO ESSENTIALLY THREE TYPES OF ACTIVITY:

1. ATTACK. ACTION TAKEN TO SEIZE GROUND AND TO KILL, CAPTURE, OR DESTROY THE ENEMY.

2. DEFENSE. ACTION TAKEN TO HOLD GROUND OR MATERIEL.

¹ AS STATED EARLIER, THE DAYLIGHT BLANK FIRING PROBLEM WAS DEVELOPED IN 1952. SINCE THE SAME PROCEDURE WAS USED FOR EACH OF THE THREE PROBLEMS, THEIR DEVELOPMENT IS DISCUSSED TOGETHER.

² FOR A MORE DETAILED DISCUSSION, SEE 53.

3. INVESTIGATION OR RECONNAISSANCE. ACTION TAKEN TO GAIN KNOWLEDGE ABOUT ENEMY ACTIVITY.

STEP 2: CONSTRUCTING THE FIELD PROBLEMS

A LIST OF CRITICAL SQUAD DUTIES WAS PREPARED FOR EACH OF THE THREE CRITERION FIELD TESTS. FOUR PHASES, OR MISSIONS, WERE DEVELOPED FOR THE DAYLIGHT BLANK FIRING PROBLEM, THREE FOR THE DAYLIGHT LIVE FIRING PROBLEM, AND ONE FOR THE NIGHT BLANK FIRING PROBLEM. A SCENARIO AS WELL AS JOB DESCRIPTIONS WERE PREPARED FOR EACH FIELD PROBLEM MISSION. THE SCENARIO SPECIFIED, IN CHRONOLOGICAL SEQUENCE, WHAT SITUATIONS THE SQUAD WAS TO MEET. JOB DESCRIPTIONS SPECIFIED WHAT THE SQUAD SHOULD DO WHEN IT ENCOUNTERED THE SITUATIONS DESCRIBED IN THE SCENARIO. CRITICAL COMBAT DUTIES WERE INCORPORATED INTO THE JOB DESCRIPTIONS AND THE SCENARIO REQUIRED THE SQUAD TO PERFORM THESE DUTIES.

STEP 3: REVIEW BY EXPERTS

THE SCENARIOS AND JOB DESCRIPTIONS WERE REVIEWED BY COMMITTEES OF THE INFANTRY SCHOOL. SUGGESTED CHANGES WERE INCORPORATED.

STEP 4: RATING ITEMS

RATING ITEMS WERE PREPARED FROM THE REVISED JOB DESCRIPTIONS. MAKING USE OF PAST EXPERIENCE IN CONSTRUCTING AND ANALYZING ITEMS DESCRIPTIVE OF FIELD PERFORMANCE, AN ATTEMPT WAS MADE TO WRITE ITEMS THAT WOULD BE OBJECTIVE, UNAMBIGUOUS, AND DESCRIPTIVE OF OBSERVABLE BEHAVIOR.

STEP 5: FIELD PROBLEM PRETEST

THE FIELD PROBLEMS WERE PRETESTED TO ASSURE THAT RATING ITEMS ACCURATELY DESCRIBED THE BEHAVIOR TO BE OBSERVED. CHECKS WERE MADE TO ASSURE THAT THE PROBLEMS PROVIDED THE SQUAD AN OPPORTUNITY TO EXECUTE ALL DUTIES DESCRIBED

BY RATING ITEMS. FURTHER INSTRUCTIONS REQUIRED FOR ADMINISTRATORS AND UMPIRES, AND CRITICAL POINTS THAT WOULD HAVE TO BE EMPHASIZED IN UMPIRE TRAINING, WERE WRITTEN.

STEP 6: REVISION, FINAL REVIEW, WEIGHTING, AND SCORING

THE FIELD PROBLEMS WERE REVISED ON THE BASIS OF PRETESTS. THE REVISED PROBLEMS WERE RESUBMITTED TO TIS COMMITTEES FOR THEIR JUDGMENTS OF THE RELATIVE IMPORTANCE OF INDIVIDUAL ITEMS AND TEST MISSIONS. THESE JUDGMENTS PROVIDED A BASIS FOR THE ASSIGNMENT OF WEIGHTS TO THE VARIOUS PARTS OF THE PROBLEMS. THESE PREASSIGNED WEIGHTS WERE USED IN COMPUTING SQUAD PERFORMANCE SCORES.

STEP 7: MANUAL FOR ADMINISTRATIVE AND UMPIRE INSTRUCTION

A MANUAL WAS WRITTEN TO ACCOMPANY EACH FIELD TEST. THE MANUAL FOR THE DAYLIGHT BLANK FIRING PROBLEM, CRT 73, WRITTEN IN 1952, WAS REVISED AS A PART OF THIS PROJECT. THE MANUALS CONTAIN INSTRUCTIONS TO ADMINISTRATORS ON HOW TO ORGANIZE EACH PROBLEM, HOW TO ADMINISTER IT IN A STANDARDIZED WAY, AND HOW TO TRAIN UMPIRES AND AGGRESSORS OR PIT DETAILS. A LIST OF MATERIEL REQUIRED FOR EACH PROBLEM IS INCLUDED.

C. RIFLE SQUAD FIELD PROBLEM, DAYLIGHT BLANK FIRING

THE DEVELOPMENTAL PROCEDURES FOR THE DAYLIGHT BLANK FIRING PROBLEM (DBFP) HAVE ALREADY BEEN DESCRIBED (53). THE PROBLEM RATING FORMS AND MANUAL, AS REVISED DURING OCTOBER 1954, ARE REPRODUCED IN SECTIONS A AND AA, APPENDIX I. OF THIS REPORT. SQUAD MOVEMENTS ARE SHOWN IN FIG. A.

D. RIFLE SQUAD FIELD PROBLEM, DAYLIGHT LIVE FIRING

WORK ON THE DEVELOPMENT OF THE DAYLIGHT LIVE FIRING PROBLEM (DLFP) WAS BEGUN IN JUNE 1953 AND WAS SUBSTANTIALLY COMPLETED DURING SEPTEMBER OF THAT YEAR.

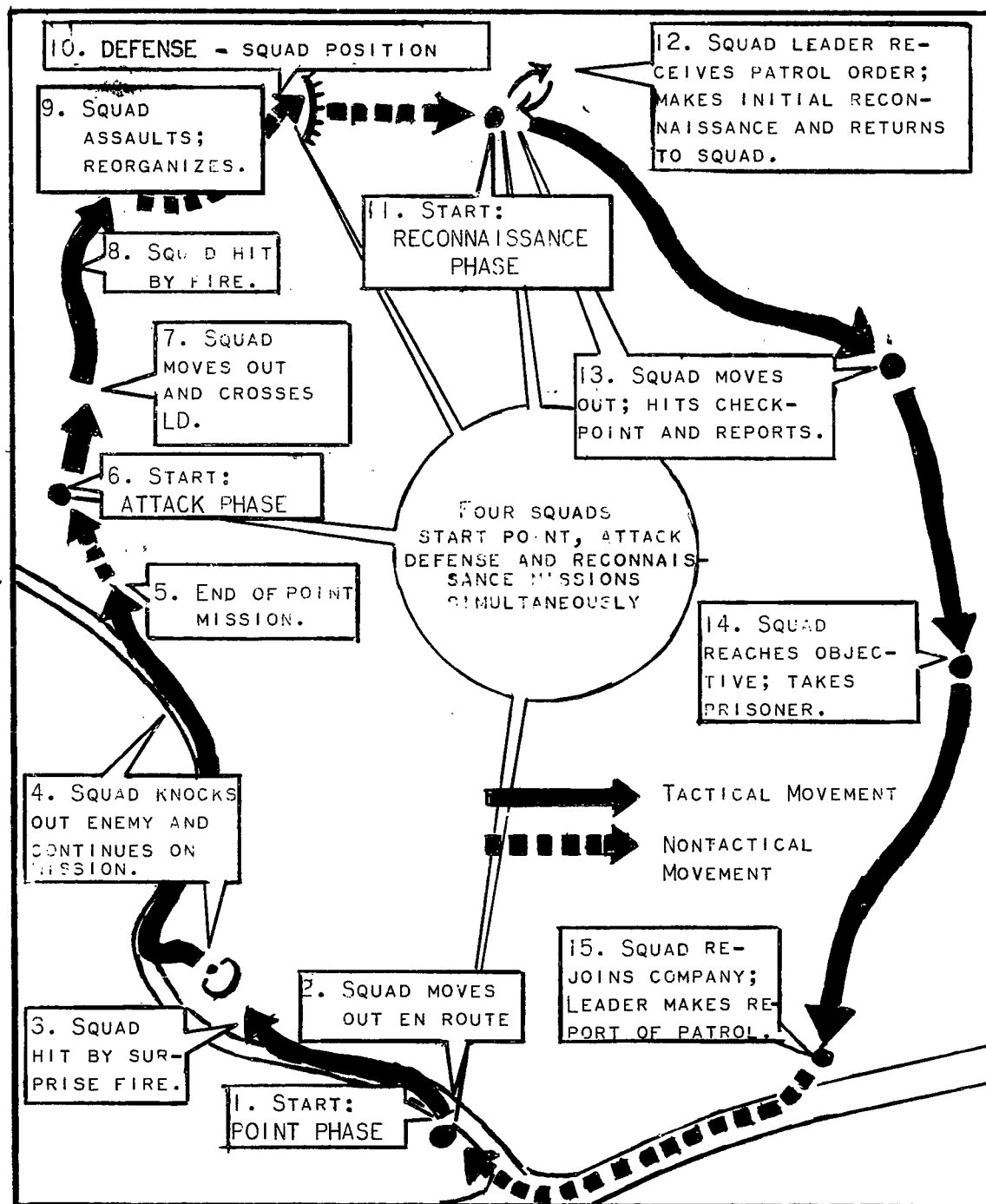


FIGURE A: THE DAYLIGHT BLANK PROBLEM: SQUAD MOVEMENT BY PHASES (NUMBERS INDICATE ACTION SEQUENCE FOR A SQUAD STARTING WITH THE POINT PHASE).

1. STEPS IN DEVELOPING THIS FIELD PROBLEM.

STEP 1: IMPORTANT SOURCES OF BACKGROUND MATERIAL FOR THE LIVE FIRING PROBLEM INCLUDED ARMY FIELD MANUALS, THE INFANTRY SCHOOL VAULT FILES, ARTICLES IN MILITARY PERIODICALS, REPORTS OF COMBAT INCIDENTS, PRB RESEARCH NOTE 6 (57), AND PRB REPORT 980 (53). CRITICAL DUTIES WERE ORGANIZED AND CLASSIFIED IN ACCORDANCE WITH THE MOST OVERRIDING CONSIDERATION FOR THIS PROBLEM--THAT IT PROVIDE A COMPREHENSIVE TEST OF THOSE CRITICAL SQUAD DUTIES WHICH COULD BE PERFORMED ONLY WITH THE USE OF LIVE AMMUNITION.

IT BECAME APPARENT EARLY IN THE STUDY OF CRITICAL SQUAD FIRING DUTIES THAT, IN ALMOST ALL COMBAT SITUATIONS, ENEMY ARE SELDOM VISIBLE TARGETS. THUS, TO BE EFFECTIVE, FIRE MUST BE AIMED NOT ONLY AT SEEN ENEMY BUT ALSO AT POSITIONS WHERE ENEMY ARE LIKELY TO BE. IT WAS THEREFORE DECIDED THAT THE SQUADS' FIRE PERFORMANCE WOULD BE MEASURED FOR THE MOST PART IN TERMS OF HITS ON HIDDEN TARGETS PLACED AT LIKELY ENEMY POSITIONS. UNIT FIRE WAS CLASSIFIED INTO FOUR BASIC DIMENSIONS, NOT ENTIRELY INDEPENDENT OF EACH OTHER: VOLUME, RATE, ACCURACY, AND DISTRIBUTION. FIRE CONTROL BY THE SQUAD LEADER, OF COURSE, IS REQUIRED FOR THE PROPER ACCOMPLISHMENT OF EACH OF THESE.

SPECIAL EMPHASIS WAS PLACED ON THE FIRING REQUIREMENTS OF COMBAT SITUATIONS. OTHER CRITICAL RIFLE SQUAD DUTIES, SUCH AS THE USE OF COVER AND CONCEALMENT, SECURITY, OBSERVATION OF THE ENEMY, ETC., WERE ALSO INCLUDED.

STEP 2: FIRING DUTIES WERE DISCUSSED WITH TIS COMMITTEES TO ASSESS THE RELATIVE IMPORTANCE OF THE VARIOUS DUTIES IN CRITICAL TACTICAL SITUATIONS. ON THE BASIS OF THESE DISCUSSIONS, THREE TACTICAL MISSIONS OR PHASES WERE CONSTRUCTED, AND SCENARIOS AND JOB DESCRIPTIONS WERE WRITTEN FOR EACH.

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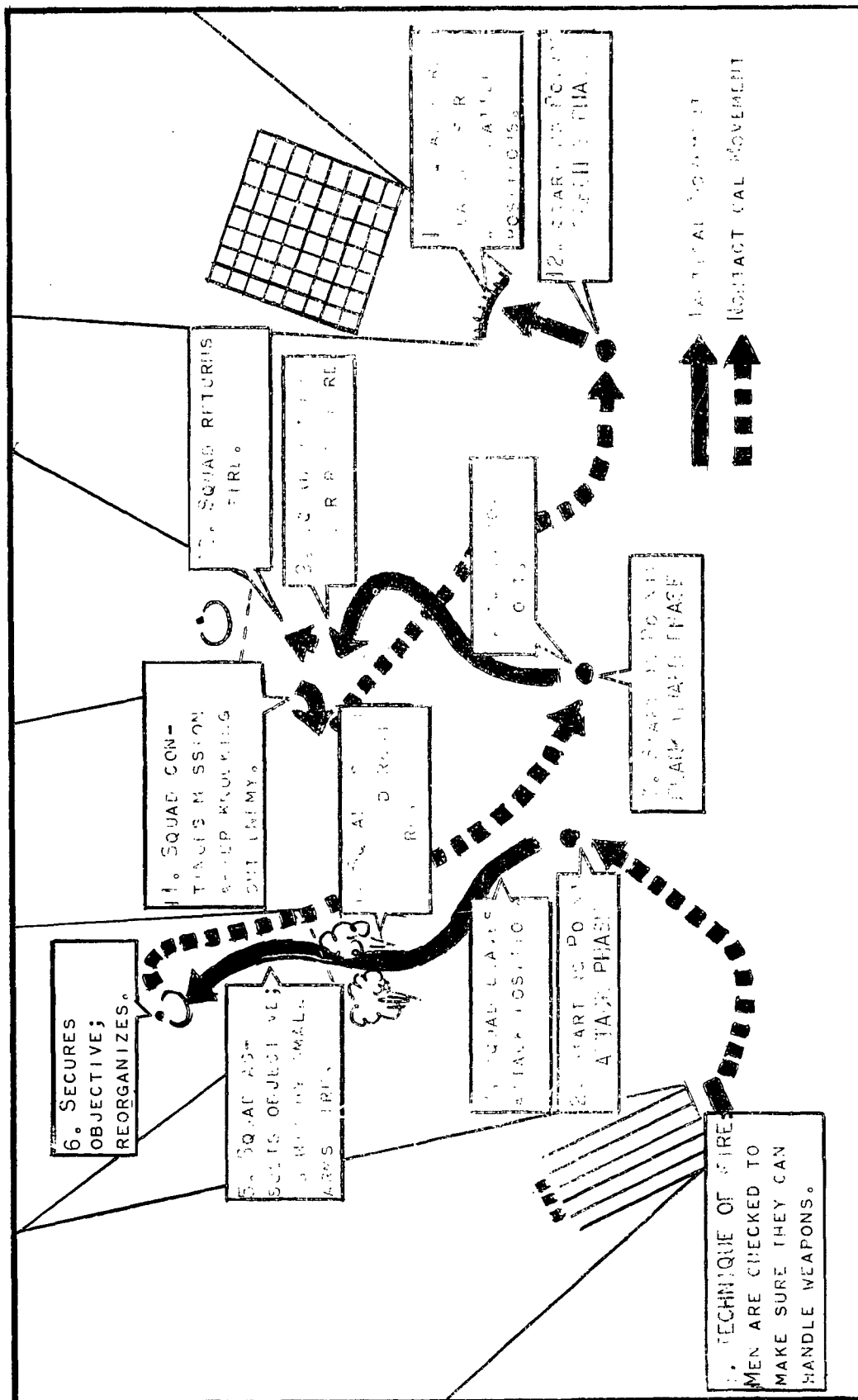


FIGURE B: LIVE FIRING PROBLEM: SQUAD MOVEMENTS BY PHASE (NUMBERS INDICATE THE ACTION SEQUENCE WHEN THE TACTICAL PHASES ARE RUN IN THE ORDER: ATTACK, FLANK GUARD, DEFENSE).

THE PHASES ARE:

1. SQUAD ATTACKING AS PART OF A COMPANY IN ATTACK.
2. SQUAD AS PART OF A RESERVE PLATOON IN DEFENSE.
3. SQUAD AS FLANK GUARD IN AN APPROACH MARCH.

IN ADDITION TO THESE THREE PHASES, A FOURTH, NONTACTICAL PHASE WAS ADDED TO CHECK THE ABILITY OF SQUAD MEMBERS TO FIRE AND HANDLE THEIR WEAPONS SAFELY. THIS WAS CALLED THE TECHNIQUE OF FIRE PHASE. SQUAD MOVEMENTS ARE SHOWN IN FIG. B. PURPOSES OF THE MISSIONS ARE SUMMARIZED AS FOLLOWS:

1. SQUAD IN ATTACK. THIS PHASE WAS TO TEST THE ABILITY OF THE SQUAD TO DEPLOY RAPIDLY AND LAY DOWN ACCURATE FIRE WHEN FIRED ON; TO ASSAULT AGGRESSIVELY; TO DELIVER A HEAVY VOLUME OF STEADY, ACCURATE AND WELL DISTRIBUTED FIRE; TO OVERRUN THE OBJECTIVE COMPLETELY AND REORGANIZE QUICKLY AND PROPERLY.

2. SQUAD IN DEFENSE. THIS PHASE WAS TO MEASURE THE SQUAD'S ABILITY TO DELIVER ACCURATE FIRE, PROPERLY DISTRIBUTED BOTH Laterally AND IN DEPTH, AT LIKELY ENEMY POSITIONS IN A SPECIFIED AREA.

3. SQUAD AS FLANK GUARD. THIS PHASE WAS TO MEASURE PERFORMANCE OF THE SQUAD WHEN HIT BY SURPRISE SMALL ARMS FIRE WITHIN RANGE. SPECIFIC DUTIES TESTED INCLUDED: LOCATING THE INCOMING FIRE; DEPLOYING AND BUILDING UP A FIRING LINE RAPIDLY; THE SQUAD LEADER'S FIRE CONTROL; AND HIS SQUAD'S ABILITY TO ENGAGE STATIONARY AND MOVING TARGETS DESIGNATED BY SMOKE AND FLASH.

STEP 3: THESE THREE PHASES WERE REVIEWED BY COMMITTEES OF THE INFANTRY SCHOOL. SUGGESTED CHANGES WERE INCORPORATED.

STEP 4: RATING ITEMS WERE WRITTEN DIRECTLY FROM THE JOB DESCRIPTIONS.

STEP 5: FIELD TRYOUTS WERE CONDUCTED WITH SIX RIFLE SQUADS OF THE 30TH INFANTRY REGIMENT AT FORT BENNING DURING AUGUST AND SEPTEMBER 1953. THE THREE TACTICAL MISSIONS WERE RUN SEPARATELY. EXTENSIVE CONFERENCES WERE HELD TO IRON OUT ADMINISTRATIVE DIFFICULTIES. NECESSARY INSTRUCTIONS WERE WRITTEN INTO THE PROBLEM MANUAL.

STEP 6: MAJOR AND MINOR REVISIONS AND REFINEMENTS WERE MADE IN THE PROBLEM AS A RESULT OF THE PRETESTS. AMONG THESE WERE:

1. DUTIES REQUIRING THE SQUAD LEADER TO BRIEF HIS MEN WERE ELIMINATED SINCE DIFFERENCES IN SQUAD LEADER "SOLUTIONS" WERE FOUND TO CREATE ADDITIONAL SAFETY HAZARDS. FURTHER, IT WAS FELT THAT THESE DUTIES WERE BEING TESTED ADEQUATELY IN THE BLANK FIRING PROBLEMS.
2. REESTIMATES OF AMMUNITION AND LOGISTIC REQUIREMENTS WERE MADE.
3. THE NUMBER OF TARGET HITS IN VARIOUS SITUATIONS WAS EMPIRICALLY DETERMINED. ON THE BASIS OF HIT EXPECTANCY ESTIMATES, THE NUMBER OF TARGETS USED IN THE DEFENSE PHASE WAS INCREASED FROM 21 TO 49.
4. EMPHASIS WAS PLACED UPON RELATIVE WEIGHTS TO BE GIVEN THE VARIOUS ASPECTS OF FIRE IN THE SITUATIONS INCLUDED IN THE PROBLEM. THE RESULTING RATING FORM IS REPRODUCED IN SECTION B OF APPENDIX I OF THIS REPORT.

STEP 7: THE LIVE FIRING PROBLEM MANUAL PREPARED IS REPRODUCED IN SECTION BB OF APPENDIX I OF THIS REPORT.

2. SPECIAL PROBLEMS

ONE OF THE DIFFICULTIES IN DEVELOPING REALISTIC FIELD PROBLEMS USING LIVE AMMUNITION WAS THE SIMULATION OF ENEMY SMALL ARMS FIRE. THIS WAS SOLVED IN THE ATTACK AND FLANK GUARD PHASES BY THE USE OF FIRECRACKERS PLACED IN FRONT OF SILHOUETTE TARGETS HIDDEN BY BRUSH. THE USE OF FIRECRACKERS IN THIS WAY IS BELIEVED TO BE AN IMPORTANT IMPROVEMENT OVER OTHER

METHODS OF SIMULATING RIFLE FIRE. FURTHER, THE COST OF FIRECRACKERS, INCLUDING FUSE, IS ABOUT ONE CENT PER ROUND--A VERY CONSIDERABLE SAVING COMPARED WITH USE OF BLANK AMMUNITION.

UNLESS SQUADS HAVE A CHANCE TO PERFORM THEIR DUTIES AT ALL LEVELS OF EFFECIENCY, THEY CANNOT BE TESTED ADEQUATELY. YET, ALLOWING FREEDOM TO MAKE MISTAKES IN A LIVE AMMUNITION PROBLEM CAN INTRODUCE SAFETY HAZARDS UNLESS CORRECTIVE MEASURES ARE TAKEN. SEVERAL PROCEDURES WERE ADOPTED SO THAT SQUADS COULD BE TESTED WITH RELATIVE SAFETY.

1. A NONTACTICAL PHASE--TECHNIQUE OF FIRE--WAS ADMINISTERED TO ALL SQUADS, PRIOR TO ADMINISTRATION OF THE TACTICAL PHASES, TO DETERMINE WHETHER EACH MAN COULD HANDLE HIS WEAPON SAFELY. SCORES OF SQUADS WITH MEN JUDGED UNSAFE WERE ADJUSTED. MEN JUDGED DOUBTFUL FOR SAFETY REASONS WERE GIVEN INSTRUCTION AND WATCHED VERY CLOSELY BY UMPIRES DURING THE TACTICAL PHASES.

2. THE PLATOON LEADER UMPIRES, RATHER THAN THE SQUAD LEADER, GAVE THE ORDERS TO THE ENTIRE SQUAD. THIS REDUCED THE PROBABILITY THAT THE SQUAD LEADER WOULD SELECT A ROUTE OR FORMATION THAT COULD HAVE BEEN DANGEROUS.

3. TERRAIN WAS SO SPECIFIED AND SELECTED THAT WHEN THE SQUAD WAS FIRED ON WHILE MOVING IN DIAMOND OR COLUMN FORMATION, A GROUND MASK KEPT THE REAR MEN FROM BEING ABLE TO FIRE EFFECTIVELY ON THE OBJECTIVE UNTIL THEY CAME UP ON LINE WITH THE LEAD MEN. THIS REDUCED THE CHANCE THAT A MAN WOULD TRY TO FIRE OVER OR BETWEEN OTHER MEN.

4. AN UMPIRE WAS INSTRUCTED TO FOLLOW AND CLOSELY WATCH EACH AUTOMATIC RIFLEMAN (AR MAN). THIS BECAME PARTICULARLY IMPORTANT IN THE ASSAULT, WHERE EXPERIENCE INDICATED THAT UNTRAINED AR MEN OFTEN DROPPED BEHIND WHEN LEADING MAGAZINES, OR WERE UNABLE TO HOLD THEIR WEAPON STEADY.

5. UMPIRES WERE CAREFULLY INSTRUCTED ON ALL MATTERS OF SAFETY.

6. RESHEARSALS, USING BLANK AMMUNITION, FAMILIARIZED UMPIRES WITH THEIR DUTIES.

3. ADMINISTRATION

THE ADMINISTRATION TIME FOR THE TECHNIQUE OF FIRE AND THE THREE TACTICAL PHASES IS ABOUT SIX HOURS. THE TEST CAN BE ADMINISTERED TO FOUR OR MORE SQUADS DAILY. THREE MEN UMPIRE EACH SQUAD, AND SIX SERVE AS PITMEN (TWO FOR THE ATTACK, ONE FOR THE DEFENSE, AND THREE FOR THE FLANK GUARD PHASES).

E. RIFLE SQUAD FIELD PROBLEM, NIGHT BLANK FIRING

1. STEPS IN FIELD PROBLEM DEVELOPMENT

STEP 1: THE MOST USEFUL SOURCE MATERIALS FOR NIGHT COMBAT DUTIES WERE COMBAT INCIDENTS COLLECTED FOR THE OPERATIONS RESEARCH OFFICE BY THE AMERICAN INSTITUTE FOR RESEARCH (1), AND INTERVIEW AND QUESTIONNAIRE MATERIAL FROM COMMITTEE MEMBERS AT THE INFANTRY SCHOOL. FIELD MANUALS, JOB DESCRIPTIONS, AND MILITARY BOOKS AND JOURNALS WERE ALSO REVIEWED.

STEP 2: PRACTICALLY ALL OF THE CRITICAL DUTIES GATHERED FROM THE ABOVE SOURCES COULD BE CATEGORIZED INTO THREE GENERAL KINDS OF ACTION: ATTACK, DEFENSE, AND PATROL. IT WAS POSSIBLE TO COMBINE THESE THREE GENERAL KINDS OF ACTION INTO A SINGLE MISSION--A COMBAT PATROL. IN THIS SINGLE MISSION, MOST OF THE CRITICAL SQUAD DUTIES COULD BE TESTED WITHOUT THE ADMINISTRATIVE COMPLICATION OF RUNNING SEVERAL SQUADS AROUND A CIRCULAR COURSE AT NIGHT. BY USING A SEPARATE LANE FOR EACH SQUAD TESTED, IT WAS ALSO POSSIBLE TO TEST BOTH NIGHT DUTIES AND DAYLIGHT DUTIES INVOLVED IN PREPARING FOR A NIGHT MISSION. SQUAD MOVEMENTS DURING THE NIGHT BLANK FIRING PROBLEM (NBFP) ARE SHOWN IN FIG. C.

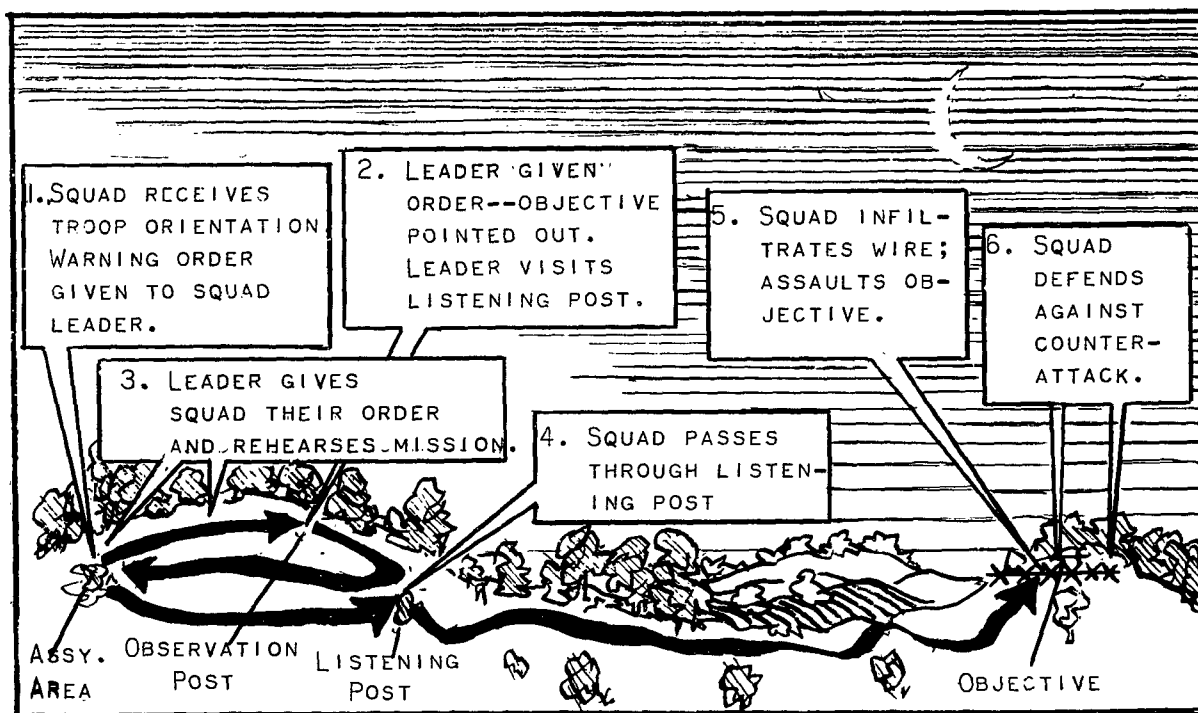


FIGURE C: NIGHT PROBLEM: SQUAD MOVEMENTS.

THE FOLLOWING DUTIES WERE TESTED:

1. THE SQUAD LEADER'S ABILITY TO: ISSUE A COMBAT PATROL ORDER; SUPERVISE PREPARATIONS FOR THE PATROL; CONDUCT REHEARSALS; USE A MAP, COMPASS, AND LANDMARKS TO DETERMINE AND MAINTAIN DIRECTION WHEN MOVING AT NIGHT; DIRECT WIRE CUTTING AND INFILTRATION THROUGH WIRE; DIRECT THE ATTACK ON AN OBJECTIVE; REORGANIZE HIS SQUAD AND REPEL COUNTERATTACKS; AND USE CORRECT RADIO PROCEDURE.

2. THE ASSISTANT SQUAD LEADER'S ABILITY TO TAKE COMMAND AND START PREPARING THE SQUAD FOR THE MISSION IN THE SQUAD LEADER'S ABSENCE, AND TO HELP CONTROL THE SQUAD THROUGHOUT THE MISSION.

3. THE SQUAD'S ABILITY TO: ASSIMILATE A PATROL ORDER; MOVE QUIETLY, MAINTAINING FORMATIONS AND SECURITY; INFILTRATE SILENTLY THROUGH WIRE; ASSAULT AN OBJECTIVE IN COORDINATION, MAINTAINING A HEAVY, STEADY VOLUME

OF FIRE ON ENEMY POSITIONS; DEPLOY AND REORGANIZE AFTER OVERRUNNING THE OBJECTIVE; DISCOVER ENEMY INFILTRATORS; REPEL COUNTERATTACKS; AND WORK TOGETHER AS A TEAM THROUGHOUT THE PROBLEM.

STEP 5: THIS RATING FORM, AFTER REVIEW BY TIS COMMITTEE MEMBERS, WAS PRETESTED FOUR TIMES WITH SQUADS OF THE 30TH INFANTRY REGIMENT, WITH AT LEAST A DAY INTERVAL BETWEEN PRETESTS. MEMBERS OF THE RESEARCH TEAM ACTED AS UMPIRES FOR THESE PRETESTS AND NOTED ITEMS THAT WERE DIFFICULT TO RATE, ADMINISTER, ETC.

THE QUESTION AROSE AS TO THE EFFECT OF DARKNESS ON THE SQUAD SCORES AND UPON THE ABILITY OF THE UMPIRES TO EVALUATE PERFORMANCE. IT WAS THE OPINION OF THE RESEARCH TEAM THAT THE EFFECT OF DARKNESS ON SQUAD PERFORMANCE WAS NOT GREAT CONSIDERING THE RANGE OF ILLUMINATION AND TEST CONDITIONS ENCOUNTERED IN THIS PROBLEM. IT WAS FELT THAT THE USE OF TWO UMPIRES PER TEST SQUAD MADE IT POSSIBLE TO ADEQUATELY EVALUATE PERFORMANCE AT NIGHT. EXCEPTIONAL NIGHT VISION IS NOT AS IMPORTANT FOR UMPIRES AS GENERAL ALERTNESS AND MOTIVATION. THE UMPIRES ONLY HAVE TO BE ABLE TO SEE THE MEN, THEIR POSITION IN FORMATION, AND, AT TIMES, THE WAY THEY ARE FACING. ALSO A NUMBER OF THE RATINGS ARE MADE ON THE BASIS OF SOUND.

STEP 6: THE REVISED RATING FORM IS REPRODUCED IN SECTION C OF APPENDIX I OF THIS REPORT.

STEP 7: THE MANUAL THAT WAS PREPARED IS REPRODUCED IN SECTION CC OF APPENDIX I OF THIS REPORT.

2. SPECIAL PROBLEMS

A PROBLEM INHERENT IN UMPIRING NIGHT PROBLEMS IS THAT OF BEING ABLE TO SEE THE RATING FORM WITHOUT INTERFERING WITH DARK ADAPTATION OR VIOLATING LIGHT SECURITY. THIS PROBLEM WAS SOLVED BY USING A FLASHLIGHT WITH AN

ULTRAVIOLET FILTER AND RATING FORMS PRINTED ON FLOURESCENT PAPER. (TECH-
NICAL DETAILS ARE GIVEN IN THE MANUAL.)

ANOTHER PROBLEM AROSE FROM THE USE OF AUTOMATIC RIFLES. BROWNING
AUTOMATIC RIFLES FIRE BLANK AMMUNITION WITH DIFFICULTY. ON THE OTHER
HAND, SUBSTITUTING M-1 RIFLES FOR AUTOMATIC RIFLES WOULD MAKE SEPAR-
ATE RATINGS OF THE PERFORMANCE OF AR MEN DIFFICULT, SINCE IT WOULD BE HARD
TO DISTINGUISH BETWEEN THEM AND RIFLEMEN. THIS PROBLEM WAS SOLVED BY
ATTACHING BRACKETS AROUND THE MUZZLES OF M-1 RIFLES, TO WHICH THE BIPOD
LEGS OF THE AUTOMATIC RIFLES WERE FASTENED. BY USING THESE BRACKETS, AR
MEN WERE DIFFERENTIATED FROM RIFLEMEN AND COULD FIRE BLANK AMMUNITION.
(SPECIFICATIONS FOR THESE BRACKETS ARE GIVEN IN THE MANUAL.)

3. ADMINISTRATION

THE PROBLEM RUNS ABOUT SIX HOURS (EXCLUSIVE OF MESSING TIME). IT STARTS
THREE AND ONE QUARTER HOURS BEFORE SUNSET. ONE SQUAD IS TESTED PER LANE.

MATERIEL REQUIREMENTS AND PREPARATIONS NEEDED TO ADMINISTER THE PROBLEM
ARE WITHIN THE MEANS OF OPERATIONAL UNITS. LANE PREPARATION, EXCEPT FOR
THE LAYING OF BARBED WIRE, IS SIMPLE. THREE ADMINISTRATIVE PERSONNEL ARE
NEEDED PER LANE. THEY ACT AT FIRST AS FRIENDLY TROOPS, THEN AS AGGRESSORS.
THEY ALSO PREPARE AND MAINTAIN THE PROBLEM LANE. TWO UMPIRES ARE USED PER
SQUAD--A PLATOON LEADER UMPIRE (PLU) AND AN ASSOCIATE UMPIRE (AU)--ALTHOUGH
PROVISION HAS BEEN MADE FOR USING ONLY ONE.

F. CRITERION SCORES

ITEMS MEASURING SQUAD LEADER AND SQUAD MEMBER PERFORMANCE ARE SEPARATED
SO THAT EACH PROBLEM PRODUCES THREE SCORES: A SQUAD LEADER SCORE, A SQUAD
MEMBER SCORE, AND A TOTAL SQUAD SCORE. SCORES ARE EXPRESSED AS PERCENTAGES.

MILITARY EXPERTS WERE CONSULTED TO DETERMINE THE WEIGHTS TO BE ASSIGNED TO EACH OF THE THREE PROBLEMS WHEN COMBINING THESE SCORES INTO COMPOSITE SCORES FOR SQUAD LEADERS, SQUAD MEMBERS AND SQUAD TOTAL. ON THE BASIS OF THEIR JUDGMENTS, THE FOLLOWING WEIGHTS WERE SPECIFIED:

	SQUAD LEADER PERCENT SCORE	SQUAD MEMBER. PERCENT SCORE.	SQUAD TOTAL PERCENT SCORE
DAYLIGHT BLANK FIRING	4	4	4
NIGHT BLANK FIRING	4	2	3
DAYLIGHT LIVE FIRING	2	4	3

CHAPTER III

ADMINISTRATION OF THE FIELD PROBLEMS

AFTER THE THREE CRITERION FIELD PROBLEMS HAD BEEN DEVELOPED, THE RESEARCH TEAM ADMINISTERED THE PROBLEMS TO 112 RIFLE SQUADS OF THE 44TH INFANTRY DIVISION AT FORT LEWIS, WASHINGTON.

A. GENERAL PREPARATIONS

THREE MAJOR PROCEDURAL STEPS WERE FOLLOWED IN PREPARING FOR STANDARDIZED ADMINISTRATION OF THE CRITERION FIELD PROBLEMS:

1. SELECTION OF TERRAIN AND PREPARATION OF COURSES
2. SELECTION AND TRAINING OF UMPIRES AND ADMINISTRATIVE PERSONNEL
3. CONDUCT OF REHEARSALS

1. SELECTION OF TERRAIN AND PREPARATION OF COURSES. FROM AREAS ASSIGNED TO THE RESEARCH TEAM, TERRAIN WAS SELECTED SO THAT THE CRITICAL DUTIES IN EACH PROBLEM COULD BE TESTED UNDER OPTIMAL CONDITION AND STILL SATISFY THE REQUIREMENTS OF TACTICAL REALISM AND ADMINISTRATIVE PRACTICALITY. TERRAIN REQUIREMENTS AND COURSE PREPARATIONS ARE DISCUSSED IN THE MANUALS FOR EACH PROBLEM (SEE APPENDIX I).

2. SELECTION AND TRAINING OF UMPIRES AND ADMINISTRATIVE PERSONNEL. TEN ENLISTED MEN WHO HAD BEEN PREVIOUSLY TRAINED AS UMPIRES ON THE DAYLIGHT BLANK FIRING PROBLEM SERVED AS UMPIRES OF THIS PROBLEM. FIVE SECOND LIEUTENANTS WERE ASSIGNED TO ACT AS SAFETY OFFICERS AND UMPIRES ON THE DAY - LIGHT LIVE FIRING PROBLEM; NINE NONCOMMISSIONED OFFICERS ALSO SERVED AS UMPIRES. TEN NCO UMPIRES WERE ASSIGNED TO THE NIGHT BLANK FIRING PROBLEM. THE NCO UMPIRES WERE SELECTED ON THE BASIS OF SCORES ON THE RIFLE SQUAD LEADER TEST (CRT 77) SCORES ON AN ARITHMETIC TEST, ABILITY TO GIVE ORDERS,

STABILITY, AND DESIRE TO TAKE PART IN THE RESEARCH PROGRAM. ADMINISTRATIVE PERSONNEL (AGGRESSORS, PITMEN, FRIENDLY TROOPS, AND SO ON) WERE SUPPLIED BY THE RECONNAISSANCE COMPANY OF THE 44TH DIVISION.

TRAINING OF EACH GROUP OF UMPIRES WAS CONDUCTED BY THE RESEARCH TEAM. IT CONSISTED OF:

1. REVIEW OF SQUAD TACTICS
2. STUDY OF THE RATING FORMS
3. STUDY OF UMPIRE DUTIES
4. FIELD ORIENTATION
5. FIELD REHEARSALS

ADMINISTRATIVE PERSONNEL WERE THOROUGHLY INSTRUCTED IN THEIR DUTIES BY RESEARCH PERSONNEL. INSTRUCTION INCLUDED PRACTICE DURING REHEARSALS, FOLLOWED BY CRITICAL REVIEW OF PERFORMANCE. INSTRUCTIONS FOR TRAINING UMPIRES AND ADMINISTRATIVE PERSONNEL ARE CONTAINED IN THE MANUALS (SEE APPENDIX I).

3. CONDUCT OF REHEARSALS

A NUMBER OF SQUADS, NOT SCHEDULED FOR TESTING, WERE ADMINISTERED EACH PROBLEM. THE PURPOSE OF THESE REHEARSALS WAS TWO-FOLD. FIRST, THEY PROVIDED AN OPPORTUNITY TO SEE THAT UMPIRES, AGGRESSORS, PITMEN, AND OTHER ADMINISTRATIVE PERSONNEL PERFORMED THEIR DUTIES CORRECTLY AND ON SCHEDULE UNDER FIELD TESTING CONDITIONS. SECONDLY, THE REHEARSALS ALLOWED "BUGS" IN THE LOGISTICAL PLAN OF THE PROBLEM TO BE SPOTTED AND CORRECTED.

REHEARSALS WERE CONDUCTED WITH FOUR SQUADS ON EACH OF THE DAYLIGHT PROBLEMS AND WITH EIGHT SQUADS ON THE NIGHT PROBLEM. THE BASES FOR RATING EACH ITEM IN THE PROBLEMS WERE DISCUSSED WITH SPECIAL REFERENCE TO THE TERRAIN ON WHICH THE ACTION WOULD TAKE PLACE. PARTICULAR ATTENTION WAS PAID TO COORDINATION AMONG UMPIRES AND ADMINISTRATIVE PERSONNEL, INCLUDING L

DEVELOPMENT OF APPROPRIATE STANDARD OPERATING PROCEDURES TO INSURE THAT TESTED SQUADS FACED COMPARABLE SITUATIONS.

B. ADMINISTRATION OF THE CRITERIA

1. THE RIFLE SQUAD FIELD PROBLEM, DAYLIGHT BLANK FIRING

THE DAYLIGHT BLANK FIRING PROBLEM AREA WAS ABOUT 600 X 1500 YARDS. THE TERRAIN VARIED THROUGHOUT IN VEGETATION AND ELEVATION. A TRAIL WAS USED FOR THE POINT OF ADVANCE GUARD PHASE. THE RECONNAISSANCE PATROL, POINT OF ADVANCE GUARD, AND THE ATTACK PHASES WERE ROUGHLY 1200, 800, AND 400 YARDS, RESPECTIVELY, IN LENGTH. PHASES WERE RUN IN THE ORDER: DEFENSE, RECONNAISSANCE PATROL, POINT OF ADVANCE GUARD, AND ATTACK. SQUADS WERE TRUCKED FROM THE END OF THE ATTACK PHASE TO THE DEFENSE PHASE.

TWO UMPIRES FOLLOWED EACH OF FOUR TEST SQUADS AND RATED THEM ON ALL FOUR PHASES. ONE UMPIRE ACTED AS PLATOON LEADER UMPIRE, THE OTHER AS ASSOCIATE UMPIRE. EACH DAY'S TESTING REQUIRED FOUR UMPIRE PAIRS; THE OTHER UMPIRE PAIR TABULATED AND SCORED TEST FORMS. TO COUNTERBALANCE ANY POSSIBLE EFFECT OF DIFFERENCES AMONG UMPIRES IN RATING, UMPIRES WERE ROTATED SO THAT EACH UMPIRE RATED APPROXIMATELY AN EQUAL NUMBER OF SQUADS WITH EVERY OTHER UMPIRE; AS PLU AND AU; AND STARTING WITH EACH PHASE.

2. THE RIFLE SQUAD FIELD PROBLEM, DAYLIGHT LIVE FIRING

THE FIRING CONES FOR THE TECHNIQUE OF FIRE PHASE AND THE THREE TACTICAL PHASES WERE LAID OUT SO THAT THE SAME IMPACT AREA WAS USED FOR ALL PHASES.

THE DEFENSE AREA WAS BOWL SHAPED, WITH A 70 X 70 YARD TARGET AREA (LAID OUT IN 10-YARD GRID SQUARES) ON ONE SIDE, AND THE FIRING LINE ON THE OTHER. THE DISTANCE FROM THE FIRING LINE WAS 150 YARDS TO THE FIRST ROW OF TARGETS AND 220 YARDS TO THE LAST ROW. THE FLANK GUARD AREA WAS LOCATED

IN A LARGE CLEARING BORDERED BY WOODS, WITH A ROAD RUNNING THROUGH THE CLEARING AND TURNING INTO THE WOODS. THE SQUAD WAS FIRED ON FROM THE WOODS WHEN THEY WERE ABOUT 170 YARDS AWAY. THE ATTACK AREA WAS A CLEARING ON HIGH GROUND WITH BROKEN WOODS ON EITHER SIDE. THESE WOODS COULD PROVIDE CONCEALMENT BETWEEN THE ATTACK POSITION AND THE ASSAULT POSITION. THE ATTACK POSITION WAS APPROXIMATELY 500 YARDS FROM THE OBJECTIVE, AND THE ASSAULT POSITION ABOUT 100 YARDS FROM THE OBJECTIVE.

ALL SQUADS FIRED THE TECHNIQUE OF FIRE FIRST. ONLY THREE SQUADS COULD BE TESTED AT A TIME ON THE TACTICAL PHASES; THEREFORE, A WAITING POSITION WAS DESIGNATED FOR THE FOURTH SQUAD. AFTER ADMINISTRATION OF TECHNIQUE OF FIRE, TESTING WAS IN THE SEQUENCE: FLANK GUARD, WAIT, DEFENSE, ATTACK. EACH DAY ONE SQUAD STARTED FROM EACH OF THESE POSITIONS. SQUADS MOVED AROUND THE COURSE UNTIL ALL SQUADS HAD COMPLETED ALL PHASES. COURSE COORDINATORS DIRECTED ALL MOVEMENT AND GRANTED CLEARANCES TO FIRE.

FOURTEEN UMPIRES WERE USED, TWO AS COURSE COORDINATORS AND 12 AS MEMBERS OF 3-MAN UMPIRE TEAMS. AN OFFICER AND A NONCOMMISSIONED OFFICER WERE COORDINATORS. EACH UMPIRE TEAM CONSISTED OF A SECOND LIEUTENANT AND TWO NONCOMMISSIONED OFFICERS. EACH TEAM SPENT THREE DAYS TESTING AND ONE DAY SCORING AND CHECKING TEST FORMS.

3. THE RIFLE SQUAD FIELD PROBLEM, NIGHT BLANK FIRING

THE NIGHT PROBLEM WAS ADMINISTERED ON FOUR LANES, APPROXIMATELY PARALLEL TO EACH OTHER AND ABOUT 500 YARDS APART. THE OBSERVATION POSTS AND OBJECTIVES WERE ON PARALLEL RIDGE LINES.

A ROTATION SCHEDULE PROVIDED THAT EACH OF THE TEN UMPIRES UMPIRED FOR FOUR NIGHTS AND SPENT ONE DAY SCORING, CHECKING, AND PREPARING RATING FORMS. IT WAS CONSIDERED IMPRACTICAL FOR AN UMPIRE TO BE REQUIRED TO KNOW ALL FOUR

LANES; THEREFORE THE UMPIRES WERE DIVIDED INTO TWO GROUPS OF FIVE, WITH EACH GROUP ASSIGNED TWO LANES. EACH UMPIRE WAS SCHEDULED ON EACH OF THE TWO LANES THE SAME NUMBER OF TIMES, AND ON EACH LANE AN EQUAL NUMBER OF TIMES AS PLATOON LEADER UMPIRE AND AS ASSOCIATE UMPIRE.

4. TEST ADMINISTRATION AND SCORING

ONE HUNDRED AND TWELVE SQUADS WERE DRAWN FROM THE 123RD, 129TH, AND 130TH INFANTRY REGIMENTS OF THE 44TH DIVISION, IN THAT ORDER, AND WERE TESTED ON THE PREDICTORS (DESCRIBED IN CHAPTER IV) AND THE CRITERION FIELD PROBLEMS. EACH NINE-MAN SQUAD SPENT FIVE WORKING DAYS IN THE TESTING PROGRAM. PREDICTOR INSTRUMENTS WERE ADMINISTERED THE FIRST TWO DAYS. ON THE LAST THREE DAYS, THE FIELD PROBLEMS WERE ADMINISTERED IN THE ORDER: DAY-
LIGHT BLANK, DAYLIGHT LIVE, AND NIGHT BLANK. SQUADS WERE TESTED AT THE RATE OF 20 PER WEEK.

SCORES OBTAINED BY USE OF THE RIFLE SQUAD FIELD PROBLEMS ARE OF THREE BASIC TYPES: A SQUAD MEMBER SCORE, A SQUAD LEADER SCORE, AND A TOTAL SQUAD SCORE. THESE SCORES CAN BE OBTAINED FOR A SINGLE PROBLEM PHASE, THE ENTIRE PROBLEM, OR FOR THE COMPOSITE OF THE THREE PROBLEMS. ALL SCORES ARE EXPRESSED AS PERCENTAGES. HOW PHASE AND PROBLEM SCORES ARE OBTAINED IS DESCRIBED IN THE PROBLEM MANUALS; THE COMPOSITE WEIGHTING SYSTEM FOR COMPUTING OVERALL SCORES ON THE THREE PROBLEMS WAS DESCRIBED IN CHAPTER II.

C. RESULTS OF ADMINISTRATION OF CRITERIA

1. INTER-UMPIRE AGREEMENT (SCORING RELIABILITY)

THE UMPIRES OF EACH SQUAD MADE INDEPENDENT RATINGS OF SQUAD ACTIONS. ON THE DBFP, BOTH UMPIRES RATED APPROXIMATELY 90% OF ALL ITEMS. BOTH UMPIRES WERE SUPPOSED TO RATE MOST BUT NOT ALL OF THE ITEMS OF THE PROBLEM. AT TIMES WHEN THE SQUAD WAS DISPERSED, EACH UMPIRE RATED HALF

OF THE SQUAD. A CORRELATION COEFFICIENT OF .87 WAS OBTAINED BETWEEN SQUAD PERCENT SCORES FROM THE RATINGS ON THESE ITEMS BY THE PAIRS OF UMPIRES. ON THE NBFP, USING THOSE TWO-THIRDS OF THE ITEMS ON WHICH BOTH UMPIRES RATED THE SAME ACTION, AN UMPIRE AGREEMENT COEFFICIENT OF .96 WAS OBTAINED. ON THE DLFP, INDEXES OF SCORER AGREEMENT WERE BASED ON COUNTS BY TWO INDEPENDENT SCORERS OF HITS ON TARGETS. THE COEFFICIENTS FOR THE THREE PHASES WERE: DEFENSE, .94; ATTACK, .98; FLANK GUARD, .99. IN SUMMARY, THE SCORER AGREEMENT INDEXES WERE HIGH FOR EACH OF THE THREE CRITERIA.

2. FREEDOM FROM BIAS.

THREE POSSIBILITIES OF BIAS, WHICH MIGHT HAVE AFFECTED SQUAD SCORES, WERE CHECKED:

1. SQUADS TESTED TOWARD THE END OF THE TESTING PROGRAM MIGHT HAVE MADE HIGHER SCORES BECAUSE THEY LEARNED ABOUT THE PROBLEM FROM SQUADS TESTED EARLIER.
2. THE FOUR LANES OF THE NBFP MIGHT HAVE DIFFERED IN DIFFICULTY.
3. BIAS MIGHT HAVE EXISTED IN THE DAYLIGHT BLANK OR LIVE PROBLEMS BECAUSE SQUADS STARTED WITH DIFFERENT PHASES.

STATISTICAL CHECKS (T-TEST FOR 1, F-TESTS FOR 2 AND 3) INDICATED THAT THESE FACTORS DID NOT BIAS SCORES, EXCEPT ON THE DAYLIGHT LIVE FIRING PROBLEM. THOUGH THE TOTAL PROBLEM SCORES ON THE DAYLIGHT LIVE FIRING PROBLEM WERE NOT SIGNIFICANTLY INFLUENCED BY PHASE ORDER, TABLE 1 SHOWS THAT PHASE SCORES DID DIFFER FOR SQUADS RUN IN DIFFERENT PHASE ORDERS. MEN WERE LEARNING TO FIRE MORE EFFECTIVELY AT LIKELY ENEMY POSITIONS DURING THE COURSE OF THE PROBLEM.

3. DISPERSION OF CRITERION SCORES. SQUAD DIFFERENCES IN PERFORMANCE SHOULD BE REFLECTED IN DISPERSION OF CRITERION SCORES. SUCH DISPERSION IS NECESSARY IF TESTS ARE TO DISCRIMINATE BETWEEN LEVELS OF ABILITY IN TEST SQUADS. THE

TABLE I

THE EFFECT OF PHASE ORDER UPON PHASE SCORES
FOR THE RIFLE SQUAD FIELD PROBLEM, DAYLIGHT LIVE FIRING

(N = 28 FOR EACH PHASE ORDER)

PHASE	PHASE ORDER	SERIAL POSITION OF PHASE	PHASE MEAN	DIFFERENCES NEEDED FOR SIGNIFICANCE AT 5% LEVEL
ATTACK SCORE				
ATTACK	ATTACK, FLANK GUARD, WAIT, DEFENSE	1	50.4	6.0
	DEFENSE, ATTACK, FLANK GUARD, WAIT	2	52.1	
	WAIT, DEFENSE, ATTACK, FLANK GUARD	3	55.5	
	FLANK GUARD, WAIT, DEFENSE, ATTACK	4	59.1	
DEFENSE SCORE				
DEFENSE	DEFENSE, ATTACK, FLANK GUARD, WAIT	1	55.0	6.0
	WAIT, DEFENSE, ATTACK, FLANK GUARD	2	55.0	
	FLANK GUARD, WAIT, DEFENSE, ATTACK	3	53.3	
	ATTACK, FLANK GUARD, WAIT, DEFENSE	4	63.1	
FLANK GUARD SCORE				
FLANK GUARD	FLANK GUARD, WAIT, DEFENSE, ATTACK	1	46.9	6.8
	ATTACK, FLANK GUARD, WAIT, DEFENSE	2	55.8	
	DEFENSE, ATTACK, FLANK GUARD, WAIT	3	54.1	
	WAIT, DEFENSE, ATTACK, FLANK GUARD	4	48.4	

MEANS AND STANDARD DEVIATIONS OF THE SQUAD SCORES (EXPRESSED AS PERCENTAGES)
ON EACH PHASE OF THE CRITERION PROBLEMS, AND THE PHASE INTERCORRELATIONS
WITHIN EACH OF THE TWO DAYLIGHT PROBLEMS, ARE PRESENTED IN TABLE 2.

THE LARGE STANDARD DEVIATIONS OF PHASE SCORES INDICATE SIGNIFICANT
DISPERSION ON ALL PROBLEMS. THE PHASE INTERCORRELATIONS FOR THE DAYLIGHT
BLANK FIRING PROBLEM WERE OF THE SAME ORDER OF MAGNITUDE AS THOSE FOUND IN

THE PREVIOUS STUDY (53); THE LOWER PHASE INTERCORRELATIONS ON THE LIVE FIRING PROBLEM ARE ATTRIBUTED IN PART TO THE RANDOMNESS OF HITS ON HIDDEN TARGETS.

TABLE 2

MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS OF PHASE SCORES ON CRITERION PROBLEMS

(N = 112)

DAYLIGHT BLANK

<u>PHASE</u>	<u>MEAN</u>	<u>S.D.</u>	<u>INTERCORRELATIONS</u>		
			<u>POINT</u>	<u>ATTACK</u>	<u>RECON.</u>
DEFENSE	53.5	10.6	.45	.52	.50
POINT	56.5	11.7		.65	.51
ATTACK	61.1	11.9			.57
RECON.	52.1	11.7			
TOTAL	55.7	9.4			

DAYLIGHT LIVE

<u>PHASE</u>	<u>MEAN</u>	<u>S.D.</u>	<u>INTERCORRELATIONS*</u>	
			<u>DEFENSE</u>	<u>FLANK GUARD</u>
ATTACK	54.3	11.6	.18	.17
DEFENSE	56.6	13.2		.21
FLANK GUARD	51.3	11.7		
TOTAL	53.5	8.0		

NIGHT BLANK

	<u>MEAN</u>	<u>S.D.</u>
TOTAL	60.7	10.9

* THESE CORRELATIONS WERE CORRECTED FOR PHASE ORDER DIFFERENCES BY AVERAGING INTERPHASE CORRELATIONS AMONG SQUADS RUN IN EACH PHASE ORDER. FISHER'S Z TRANSFORMATION WAS USED IN AVERAGING CORRELATIONS.

THE COMPOSITE SCORES OF THE SQUAD LEADER, THE SQUAD MEMBERS, AND OF THE ENTIRE SQUAD ARE PRESENTED IN TABLE 3. THE DISPERSION OF THESE SCORES INDICATES THAT RELATIVELY LARGE DIFFERENCES IN COMBAT READINESS EXISTED BETWEEN SQUADS ON ALL CRITERION MEASURES.

TABLE 3
MEANS AND STANDARD DEVIATIONS OF CRITERION SCORES

	LEADER		MEMBER		SQUAD	
	MEAN	S.D.	MEAN	S.D.	MEAN	S.D.
DAYLIGHT BLANK FIRING	56.8	10.2	55.2	9.8	55.7	9.4
DAYLIGHT LIVE FIRING	57.4	12.8	52.7	8.2	53.5	8.0
NIGHT BLANK FIRING	57.8	11.2	65.1	12.0	60.7	10.9
WEIGHTED COMPOSITE OF 3 CRITERIA	57.2	9.1	56.1	7.4	56.6	7.6

4. CORRELATIONS AMONG CRITERION SCORES.

TABLE 4 PRESENTS THE LEADER-LEADER, MEMBER-MEMBER, AND SQUAD-SQUAD INTERCORRELATION COEFFICIENTS FOR THE THREE CRITERION PROBLEMS. THE RELATIVELY LOW MAGNITUDE OF THESE COEFFICIENTS INDICATES THAT THE LIVE FIRING AND NIGHT PROBLEMS DO MAKE A DISTINCT CONTRIBUTION BEYOND THAT MADE BY THE DAYLIGHT BLANK PROBLEM.

TABLE 4

CORRELATION COEFFICIENTS
BETWEEN LEADER-LEADER, MEMBER-MEMBER,
AND SQUAD-SQUAD SCORES FOR THE THREE CRITERION PROBLEMS

<u>SCORES</u>	<u>PROBLEMS CORRELATED</u>	<u>R</u>
LEADER SCORES	DAYLIGHT BLANK-DAYLIGHT LIVE	.44
	DAYLIGHT BLANK-NIGHT BLANK	.51
	DAYLIGHT LIVE-NIGHT BLANK	.39
MEMBER SCORES	DAYLIGHT BLANK-DAYLIGHT LIVE	.28
	DAYLIGHT BLANK-NIGHT BLANK	.54
	DAYLIGHT LIVE-NIGHT BLANK	.32
SQUAD SCORES	DAYLIGHT BLANK-DAYLIGHT LIVE	.38
	DAYLIGHT BLANK-NIGHT BLANK	.58
	DAYLIGHT LIVE-NIGHT BLANK	.23

TABLE 5 SHOWS THE CORRELATION COEFFICIENTS BETWEEN LEADER AND MEMBER SCORES ON EACH OF THE CRITERION PROBLEMS AS WELL AS ON THE COMPOSITE. THE MAGNITUDE OF THESE COEFFICIENTS SHOWS THE IMPORTANT ROLE OF THE LEADER IN GETTING SQUAD MEMBERS TO PERFORM THEIR DUTIES PROPERLY. A RECIPROCAL INFLUENCE, HOWEVER, WAS OBSERVED IN SOME INSTANCES--THERE WERE SQUADS WHOSE LEADER WAS GREATLY HELPED BY THE ADVICE AND HELP OF SQUAD MEMBERS WITH "KNOW HOW", AND WHOSE LEADER SCORES WERE THEREBY INCREASED.

TABLE 5
CORRELATION COEFFICIENTS
BETWEEN LEADER AND MEMBER CRITERION SCORES

<u>CRITERION</u>	<u>R</u>
DAYLIGHT BLANK	.73
DAYLIGHT LIVE	.44
NIGHT BLANK	.78
COMPOSITE	.78

D. SUMMARY

THE THREE CRITERION PROBLEMS, AND MANUALS GIVING INSTRUCTIONS FOR STANDARDIZED ADMINISTRATION OF EACH, WERE DEVELOPED IN CLOSE COOPERATION WITH OFFICERS AT THE INFANTRY SCHOOL ACCORDING TO PROCEDURES WORKED OUT IN A PREVIOUS STUDY (53). AFTER COURSE PREPARATION AND UMPIRE TRAINING, THESE PROBLEMS WERE ADMINISTERED TO 112 INFANTRY RIFLE SQUADS OF THE 44TH DIVISION AT FORT LEWIS, WASHINGTON. THE PROBLEMS PROVIDED SCORES AGAINST WHICH PREDICTOR INSTRUMENTS WERE TO BE VALIDATED. EXAMINATION OF THE CRITERION DATA (COMPOSITE SCORES ON THE THREE FIELD PROBLEMS) WAS MADE TO DETERMINE WHETHER THEY SATISFIED CONDITIONS WHICH MAKE EFFECTIVE PREDICTION POSSIBLE, WITH THESE RESULTS:

1. A HIGH DEGREE OF INTERSCORER AGREEMENT WAS FOUND.
2. TOTAL PROBLEM SCORES WERE NOT SIGNIFICANTLY AFFECTED BY DIFFERENCES IN PHASE ORDER OR LANES, NOR BY THE POSSIBILITY THAT SQUADS TESTED LATER IN THE PROGRAM MIGHT HAVE LEARNED ABOUT THE PROBLEM FROM THOSE TESTED EARLIER.

3. THE STANDARD DEVIATIONS OF THE SEPARATE PROBLEM SCORES AND OF THE COMPOSITE SQUAD SCORES INDICATED THAT THERE WAS CONSIDERABLE DISPERSION IN THE CRITERION MEASURES. THIS DISPERSION IS A PREREQUISITE FOR THE DIFFERENTIAL PREDICTION OF PERFORMANCE SCORES.

4. EACH OF THE THREE FIELD PROBLEMS MADE A REASONABLY INDEPENDENT CONTRIBUTION TO THE COMPOSITE SCORES, ALTHOUGH THERE WAS A CORE OF DUTIES COMMON TO THE THREE PROBLEMS.

SINCE THE CRITERION DATA HAVE BEEN SHOWN TO BE RELIABLE AND FREE FROM PRACTICE-EFFECT BIAS AND SINCE THEY DISCRIMINATE LEVELS OF PERFORMANCE BETWEEN TEST SQUADS, IT IS FEASIBLE TO CONSIDER VARIABLES FOR PREDICTING THESE CRITERION SCORES.

CHAPTER IV

DEVELOPMENT OF PREDICTORS

A. INTRODUCTION

A SECOND MAJOR OBJECTIVE OF THIS STUDY WAS TO IDENTIFY VARIABLES THAT MIGHT BE USED TO PREDICT SQUAD PERFORMANCE. THIS INVOLVED FURTHER STUDY OF PREDICTORS OF COMBAT READINESS USED IN TWO PREVIOUS STUDIES (53, 54) AND THE DEVELOPMENT OF ADDITIONAL MEASURES WHICH, IT WAS BELIEVED, WOULD TAP STILL OTHER SOCIO-PSYCHOLOGICAL DETERMINANTS OF THE LEVEL OF SQUAD EFFECTIVENESS. IF UNIT EFFECTIVENESS CAN BE SUCCESSFULLY PREDICTED, THE MAJOR PSYCHOLOGICAL FACTORS WHICH MAKE FOR EFFECTIVE GROUPS AND GROUP LEADERS WILL BE BETTER UNDERSTOOD AND THE SELECTION OF MEN AND LEADERS FOR SMALL UNITS CAN BE IMPROVED.

CONSIDERABLE EVIDENCE, GATHERED DURING AND SINCE WORLD WAR II, INDICATED THAT SOME INDIVIDUAL AND UNIT CHARACTERISTICS ARE SYSTEMATICALLY RELATED TO PERFORMANCE IN COMBAT AND IN TRAINING (FOR EXAMPLE, 12, 25). EARLIER STUDIES IN THE PRESENT RESEARCH PROGRAM (29, 53, 54) ALSO INDICATED THAT SMALL UNIT COMBAT READINESS CAN BE PREDICTED. HOWEVER, THE COMPLEXITY OF THE DETERMINANTS OF SMALL UNIT EFFECTIVENESS ARGUE, NOT ONLY FOR A CONSIDERATION OF MANY INTERRELATED FACTORS, BUT ALSO FOR AN ORDERING OF THESE FACTORS INTO A SYSTEMATIC, COHERENT FRAMEWORK. WITH SUCH A CONCEPTUAL FRAMEWORK IT CAN BE BETTER UNDERSTOOD HOW THE INDIVIDUAL FACTORS AND THEIR INTERRELATIONSHIPS CONTRIBUTE TO EFFECTIVE SMALL UNIT PERFORMANCE.

B. FRAMEWORK FOR THE SELECTION OF PREDICTORS

THE RIFLE SQUAD IS ONE KIND OF SOCIO-PSYCHOLOGICAL GROUP. IT IS FORMALLY ORGANIZED, AS SPECIFIED BY AN ARMY TABLE OF ORGANIZATION (T/O), TO PERFORM SPECIFIC MISSIONS DICTATED BY THE ARMY ORGANIZATION. AS

A SUBGROUP WITHIN A LARGER ORGANIZATION, ITS FREEDOM OF ACTION IS MARKEDLY LIMITED. ITS FORMAL STRUCTURE, ITS FORMAL LEADERSHIP, AND MOST OF ITS FORMAL RULES AND DUTIES ARE A FUNCTION OF ITS T/O.

YET, IN THE RIFLE SQUAD, AS IN ALL GROUPS, AN INFORMAL STRUCTURE DEVELOPS ABOUT ITS FORMAL STRUCTURE. EACH MEMBER OF THE RIFLE SQUAD HAS A PERSONALITY SOMEWHAT DIFFERENT FROM THOSE OF HIS TEAMMATES AND FROM THOSE OF MEN IN SIMILAR POSITIONS IN OTHER SQUADS. HOWEVER SPECIFICALLY THE ARMY DEFINES DUTIES AND ROLES WHICH MEN IN EACH POSITION MUST FULFILL, EACH MAN PERFORMS THESE DUTIES IN A SOMEWHAT DIFFERENT WAY. THE MANNER IN WHICH A LEADER AND HIS MEN PERFORM THEIR SQUAD DUTIES, AND THE WAY IN WHICH THESE ACTIONS MESH, OR FAIL TO MESH, GIVES EACH RIFLE SQUAD A CHARACTERISTIC QUALITY.

IT SEEMS REASONABLE TO ATTRIBUTE DIFFERENCES BETWEEN SQUADS TO ONE OR MORE OF THREE GROUPS OF FACTORS:

1. THE CHARACTERISTICS WHICH INDIVIDUAL MEN CONTRIBUTE TO SQUAD SUCCESS: THE ABILITIES, PERSONALITY TRAITS, AND MOTIVATIONS OF THE LEADER AND MEN WHO MAKE UP THE UNIT.
2. THE INTERPERSONAL RELATIONSHIPS WHICH DEVELOP BETWEEN THE LEADER AND HIS MEN AND AMONG THE MEN THEMSELVES.
3. GROUP-DERIVED MOTIVATIONS WHICH AFFECT INDIVIDUAL PERFORMANCES.

THESE THREE GENERAL GROUPS OF FACTORS WHICH MIGHT PRODUCE DIFFERENCES BETWEEN SQUADS IN THEIR PERFORMANCE OF ASSIGNED MISSIONS WERE THE BASIS FOR CLASSIFYING THE VARIABLES INVESTIGATED IN THIS STUDY. SPECIFIC PREDICTORS WERE DESIGNED TO TAP SEEMINGLY CRITICAL VARIABLES WITHIN EACH OF THESE THREE GROUPS. WITHIN EACH GROUP, PREDICTORS WERE FURTHER SUBCLASSIFIED IN TERMS OF LEADER AND MEMBER VARIABLES. IN TABLE 6 IS AN OUTLINE OF GROUPINGS,

AND OF THE PREDICTORS INCLUDED UNDER EACH (THE NUMBERS IN PARENTHESES FOLLOWING THE VARIABLES ARE VARIABLE NUMBERS WHICH ARE USED IN THE DESCRIPTION FOLLOWING THE TABLE).

TABLE 6

OUTLINE OF PREDICTORS OF SQUAD PERFORMANCE

INDIVIDUAL CHARACTERISTICS1. LEADER VARIABLESA. ABILITIES

(1) GENERAL LEARNING ABILITY

(A) APTITUDE AREA 1 SCORES (1)

(2) SPECIFIC JOB-RELATED ABILITIES

(A) RIFLE SQUAD LEADER TEST (2)

(B) PRB BASIC MILITARY PROFICIENCY TEST (3)

(C) TACTICAL AGGRESSIVENESS TEST (4)

B. PERSONALITY CHARACTERISTICS

(1) LEVEL OF ASPIRATION FOR SELF (5)

(2) RECOGNITION OF INDIVIDUAL DIFFERENCES IN SQUAD MEMBERS:
ASSUMED SIMILARITY (6)

(3) EMOTIONAL STABILITY: PERIPHERAL NERVOUSNESS (7)

(4) PHYSICAL PROWESS (8)

(5) SOCIAL ACTIVENESS (9)

(6) JOB ADJUSTMENT

(A) GENERAL ARMY ADJUSTMENT (10)

(B) PREFERENCE FOR FIGHTING JOBS (11)

(7) PRB ARMY PICTURE TEST (12)

2. MEMBER VARIABLESA. ABILITIES

(1) GENERAL LEARNING ABILITY

(A) APTITUDE AREA I SCORES (13)

(2) SPECIFIC JOB-RELATED ABILITIES

(A) BASIC MILITARY PROFICIENCY TEST (14)

(B) MARKSMANSHIP QUALIFICATION SCORES (15)

B. PERSONALITY CHARACTERISTICS

(1) PHYSICAL PROWESS (16)

(2) SOCIAL ACTIVENESS (17)

(3) PERIPHERAL NERVOUSNESS (18)

(4) JOB ADJUSTMENT

(A) GENERAL ARMY ADJUSTMENT (19)

(B) PREFERENCES FOR FIGHTING JOBS (20)

C. BIOGRAPHICAL CHARACTERISTICS

(1) AGE (21)

(2) EDUCATIONAL LEVEL (22)

INTERPERSONAL RELATIONSHIPS WITHIN THE SQUAD

I. LEADER-MEMBER RELATIONSHIPS

A. INTERPERSONAL PREFERENCES

(1) POSITIVE SOCIOMETRIC CHOICES GIVEN BY LEADER (23)

(2) POSITIVE PLUS NEGATIVE SOCIOMETRIC CHOICES RECEIVED BY LEADER (24)

(3) ASSUMED SIMILARITY OF SQUAD LEADER WHEN HE IS THE SOCIOMETRIC CHOICE OF THE SQUAD (25)

B. ACCURACY OF ESTIMATES OF MEMBER RESPONSES

(1) KNOWLEDGEABILITY, NONTACTICAL SITUATIONS (26)

(2) KNOWLEDGEABILITY, NONTACTICAL SITUATIONS, SUBSCORE A (27)

(3) KNOWLEDGEABILITY, NONTACTICAL SITUATION, SUBSCORE B (28)

(4) KNOWLEDGEABILITY, TACTICAL SITUATIONS (29)

C. MEMBERS PERCEPTIONS OF SQUAD LEADER BEHAVIOR

(1) SQUAD LEADER ROLE DISCREPANCY (30)

(2) SQUAD LEADER AS PROBLEM SOLVER (31)

(3) EVALUATION OF SQUAD LEADER (32)

D. LEADER-MEMBER TEAMWORK

(1) LEADERSHIP SUBSCORE, FIELD PROBLEM CHECKLIST (33)

(2) MUTUAL CORRECTIVE FACTOR SUBSCORE, FIELD PROBLEM CHECKLIST (34)

2. MEMBER-MEMBER RELATIONSHIPSA. INTERPERSONAL PREFERENCES

(1) POSITIVE PLUS NEGATIVE SOCIOMETRIC CHOICES WITHIN SQUAD (35)

(2) POSITIVE SOCIOMETRIC CHOICES WITHIN SQUAD (36)

(3) HYPOTHETICAL SQUAD; NUMBER OF MEN FROM OWN SQUAD CHOSEN IN ANY POSITION (37)

(4) HYPOTHETICAL SQUAD; NUMBER OF MEN FROM OWN SQUAD CHOSEN IN SAME POSITIONS (38)

(5) HYPOTHETICAL SQUAD; NUMBER OF MEN FROM OWN SQUAD CHOSEN IN DIFFERENT POSITIONS (39)

(6) PREFERENCE FOR WORKING WITH MEN FROM OWN SQUAD (40)

B. KNOWLEDGEABILITY

(1) KNOWLEDGEABILITY, NONTACTICAL SITUATIONS (41)

(2) KNOWLEDGEABILITY, NONTACTICAL SITUATIONS, SUBSCORE A (42)

(3) KNOWLEDGEABILITY, NONTACTICAL SITUATIONS, SUBSCORE B (43)

(4) KNOWLEDGEABILITY, TACTICAL SITUATIONS (44)

GROUP-DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS1. PRIDE IN UNIT (45)2. LEADER VARIABLESA. REFERENCE GROUP MEASURES

(1) SQUAD AS REFERENCE GROUP (46)

(2) ARMY AS REFERENCE GROUP (47)

B. GROUP-GOAL ORIENTATION

(1) RANK OF FIELD PROBLEM CARTOON FOR SELF (48)

- (2) RANK OF FIELD PROBLEM CARTOON ATTRIBUTED TO SQUAD (49)
- (3) PRODUCT OF RANK AND PREFERENCE RATING OF FIELD PROBLEM CARTOON FOR SELF (50)

3. MEMBER VARIABLES

A. REFERENCE GROUP MEASURES

- (1) SQUAD AS REFERENCE GROUP (51)
- (2) ARMY AS REFERENCE GROUP (52)

B. GROUP-GOAL ORIENTATION

- (1) LEVEL OF ASPIRATION FOR SQUAD (53)
- (2) RANK OF FIELD PROBLEM CARTOON FOR SELF (54)
- (3) RANK OF FIELD PROBLEM CARTOON ATTRIBUTED TO SQUAD (55)
- (4) PRODUCT OF RANK AND PREFERENCE RATING OF FIELD PROBLEM CARTOON FOR SELF (56)
- (5) PERCEIVED SELF-SQUAD DIFFERENCES IN CARTOON RANKING (57)
- (6) MOTIVATION SUBSCORE, FIELD PROBLEM CHECKLIST (58)

C. INDIVIDUAL CHARACTERISTICS OF LEADER AND MEMBERS

I. LEADER

A. ABILITIES. IT IS REASONABLE TO ASSUME THAT THE SQUAD LEADER'S GENERAL LEARNING ABILITY, AS MEASURED BY APTITUDE AREA 1 (VARIABLE 1), WOULD ENABLE HIM TO LEARN HIS JOB FASTER AND BETTER. THAT GENERAL INTELLIGENCE IS RELATED TO LEADER ABILITY IS DOCUMENTED IN HISTORICAL ACCOUNTS (22). IT WAS FOUND IN AN EARLIER STUDY OF THIS SERIES (54, P. 9) THAT THE LEADERS OF THE SQUADS WITH HIGHEST CRITERION SCORES HAD HIGHER APTITUDE AREA 1 SCORES THAN DID THE LEADERS OF SQUADS SCORING LOWEST ON THE CRITERION. THESE SCORES WERE OBTAINED FROM FORMS 20.

MEASURES OF KNOWLEDGE AND SKILLS MORE SPECIFIC TO THE JOB OF DIRECTING A RIFLE SQUAD WOULD APPEAR EVEN MORE PROMISING FOR PREDICTION OF SQUAD

PERFORMANCE: KNOWLEDGE OF TACTICS, KNOWLEDGE OF WEAPONS, MAP READING SKILLS, LEADER SKILLS AND SKILL IN PERFORMING THE ROLE OF TACTICAL LEADER. THREE PREDICTOR TESTS WERE USED TO MEASURE THESE AREAS.

(1) THE RIFLE SQUAD LEADER TEST (VARIABLE 2) WAS DEVELOPED BY PSYCHOLOGICAL RESEARCH ASSOCIATES. THIS TEST WAS DEVELOPED SPECIFICALLY TO ASSESS HOW WELL THE SQUAD LEADER KNOWS THE THINGS HE NEEDS TO KNOW TO DIRECT HIS SQUAD EFFECTIVELY. IN A PREVIOUS STUDY (53) THE CORRELATION COEFFICIENT OF AN EARLIER FORM OF THIS TEST WITH THE LEADER'S FIELD PERFORMANCE SCORE WAS .38. THE TEST WAS ITEM ANALYZED AND PRETESTED ON A NUMBER OF ADDITIONAL RIFLE SQUAD LEADERS; AND THE NUMBER OF ITEMS WAS REDUCED FROM 77 TO 54 ON THE BASIS OF THESE RESULTS. THESE 54 ITEMS WERE INCORPORATED INTO THE TEST FORM USED IN THIS STUDY.

(2) THE BASIC MILITARY PROFICIENCY TEST (VARIABLE 3) WAS DEVELOPED BY THE PERSONNEL RESEARCH BRANCH OF THE ADJUTANT GENERAL'S OFFICE. THIS TEST HAS BEEN USED BY PRB AS A MEASURE OF TRAINEE KNOWLEDGE OF BASIC MILITARY SUBJECTS. IT IS DESIGNED FOR THE BASIC TRAINEE, NOT SPECIFICALLY FOR THE RIFLE SQUAD LEADER AS IS THE RIFLE SQUAD LEADER TEST. THIS TEST WAS ADMINISTERED TO SQUAD LEADERS, AS WELL AS TO SQUAD MEMBERS, IN ORDER TO TAP A MORE GENERAL MILITARY PROFICIENCY.

(3) THE TACTICAL AGGRESSIVENESS TEST (VARIABLE 4). AGGRESSIVENESS HAS LONG BEEN RECOGNIZED AS A CHARACTERISTIC OF SUCCESSFUL MILITARY LEADERS. AGGRESSIVENESS HERE MEANS WILLINGNESS TO TAKE OVER THE RESPONSIBILITY OF LEADERSHIP, DESIRE TO IMPOSE ONE'S WILL UPON THE SITUATION--TO MAKE THINGS HAPPEN, TO DIRECT THE COURSE OF EVENTS, RATHER THAN TO REACT PASSIVELY TO THE SITUATION. IN THE PREVIOUS FIELD TESTING AND IN UNIT STUDIES CONDUCTED SINCE THEN, THIS CHARACTERISTIC HAS BEEN OBSERVED IN SUCCESSFUL RIFLE SQUAD LEADERS, ESPECIALLY IN INSTANCES WHEN THE TACTICAL SITUATION CHANGES RAPIDLY.

IN SUCH INSTANCES, THE MORE AGGRESSIVE LEADERS TAKE CONTROL AND START GIVING ORDERS. THEY ARE ABLE TO HOLD THE CONFIDENCE OF THEIR MEN BETTER THAN THOSE LEADERS WHO ARE SLOW TO MAKE DECISIONS OR SLOW TO TAKE ACTION WHEN THE CHANGING SITUATION REQUIRES. INCIDENTS DRAWN FROM COMBAT ACCOUNTS SHOW THAT POOR LEADERS OFTEN ATTEMPT TO WITHDRAW FROM THE LEADERSHIP SITUATION IF THEY HAVE AN OPPORTUNITY. IN A PREVIOUS STUDY (54), A TEST OF SQUAD LEADER "WILLINGNESS TO ACT" IN AN AMBIGUOUS SITUATION DISCRIMINATED SIGNIFICANTLY BETWEEN LEADERS OF SQUADS WITH HIGH AND LOW CRITERION SCORES.

THE TACTICAL AGGRESSIVENESS TEST WAS DEVELOPED ACCORDING TO THE FOLLOWING RATIONALE: IN SITUATIONS CHARACTERIZED BY LACK OF SUFFICIENT INFORMATION, SEVERAL ALTERNATIVE COURSES OF ACTION ARE OFTEN POSSIBLE. THE RELATIVE MERITS OF THESE COURSES OF ACTION CANNOT ALWAYS BE EVALUATED BY THE COMBAT LEADER IN THE MIDST OF THE SITUATION, AND TACTICAL KNOWLEDGE ALONE CANNOT DICTATE THE "BEST" SOLUTION. IN RESPONDING TO SUCH SITUATIONS, THE GOOD SQUAD LEADER WOULD BE EXPECTED TO CHOOSE THE MORE ACTIVE OR AGGRESSIVE COURSE OF ACTION. THE TACTICAL AGGRESSIVENESS TEST POSES THE SQUAD LEADER SUCH HYPOTHETICAL SITUATIONS AND ASKS HIM TO CHOOSE ONE OF THREE GIVEN ALTERNATIVE COURSES OF ACTION, THE TACTICAL MERITS OF WHICH ARE ABOUT EQUAL BUT WHICH VARY IN AGGRESSIVENESS. IT WAS HYPOTHESIZED THAT THE AGGRESSIVE LEADER WOULD MORE OFTEN CHOOSE THE MOST ACTIVE OR AGGRESSIVE ALTERNATIVE AND THAT THIS TYPE OF LEADER WOULD BE MORE PROFICIENT ON THE FIELD PROBLEMS.

B. PERSONALITY CHARACTERISTICS. IT SEEMS LOGICAL THAT THE LEADER'S PERSONALITY AFFECTS THE EXTENT TO WHICH HE MOBILIZES HIS CAPABILITIES, THE WAY IN WHICH HE CONTROLS HIS MEN TO GET THEIR COOPERATION, AND THE WAY IN WHICH HE DIRECTS THEM TO WORK AS AN EFFECTIVE TEAM. A NUMBER OF VARIABLES IN THIS AREA WERE INCLUDED IN THE PRESENT STUDY.

(1) SQUAD LEADER MOTIVATION OR DESIRE FOR ACHIEVEMENT (LEVEL OF ASPIRATION FOR SELF, VARIABLE 5). THE LEADER WITH PRIDE IN HIMSELF, WHO FEELS A STRONG DESIRE TO DO WELL IN HIS ACTIVITIES AND RESPONSIBILITIES, WOULD SEEM MORE LIKELY TO LEAD A GROUP EFFECTIVELY THAN A LEADER WHO SETS LOWER STANDARDS OF ACHIEVEMENT FOR HIMSELF. IN THE PREVIOUS STUDY (53), THIS CHARACTERISTIC SHOWED SOME PROMISE AS A PREDICTOR. THE EIGHT-ITEM SCALE USED IN THAT STUDY WAS ITEM ANALYZED, AND A REVISED 10-ITEM SCALE WAS CONSTRUCTED ON THE BASIS OF THESE RESULTS.

(2) RECOGNITION OF INDIVIDUAL DIFFERENCES IN SQUAD MEMBERS (ASSUMED SIMILARITY, VARIABLE 6). IT IS FREQUENTLY POINTED OUT IN MILITARY AND PSYCHOLOGICAL LITERATURE THAT THE "GOOD LEADER" IS THE DISCRIMINATING LEADER. HE DOES NOT TREAT ALL OF HIS MEN ALIKE, BUT RATHER LEARNS WHAT EACH MAN'S WANTS, LIKES, AND SO ON AND THEREBY PLAYS A SOMEWHAT DIFFERENT ROLE IN HIS PERSONAL CONTACTS WITH EACH MAN IN HIS GROUP. MARKED AND CONSISTENT DIFFERENCES IN LEADERS HAVE BEEN FOUND (4, 5, 6, 7) IN THE EXTENT TO WHICH THEY TREAT FOLLOWERS AS IF THEY WERE ALIKE, AS CONTRASTED WITH THE EXTENT TO WHICH THEY RECOGNIZE INDIVIDUAL DIFFERENCES AND MAKE USE OF THESE DIFFERENCES IN DEALING WITH EACH GROUP MEMBER. FOR SOME GROUPS THE NONDISCRIMINATING LEADER WORKED MOST EFFECTIVELY, FOR GOAL-ORIENTED GROUPS (FOR EXAMPLE, BASKETBALL TEAMS, SURVEYING CREWS) THE DISCRIMINATING TYPE OF LEADER WAS MOST EFFECTIVE. THE RIFLE SQUAD IS OF THE LATTER TYPE, AND IT WAS THEREFORE HYPOTHESIZED THAT SQUAD LEADERS WHO RECOGNIZED DIFFERENCES BETWEEN MEMBERS WOULD BE THE MOST EFFECTIVE SQUAD LEADERS.

THE MEASURE OF ASSUMED SIMILARITY (VARIABLE 6, INSTRUMENT M) WAS DEVELOPED IN THE FOLLOWING WAY: THE SQUAD LEADER WAS ASKED TO RESPOND TO A 27-ITEM PERSONALITY INVENTORY. THEN HE WAS ASKED TO RESPOND TO THOSE SAME ITEMS, FIRST AS HE THOUGHT THE SQUAD MEMBER WITH WHOM HE WORKED BEST

WOULD RESPOND, THEN AS HE THOUGHT THE SQUAD MEMBER WITH WHOM HE WORKED LEAST WELL WOULD RESPOND. DISCREPANCIES BETWEEN THE LATTER TWO SETS OF SCORES WERE SUMMED TO OBTAIN AN ASSUMED SIMILARITY SCORE FOR THE SQUAD LEADER. THE HIGHER THE SCORE, THE GREATER THE TENDENCY OF THE SQUAD LEADER TO DISCRIMINATE BETWEEN HIS MEN IN TERMS OF THEIR LIKES AND DISLIKES, AND (IT WAS HYPOTHESIZED) THE MORE EFFECTIVE HE WOULD BE.

(3) EMOTIONAL STABILITY (PERIPHERAL NERVOUSNESS, VARIABLE 7). IF A MAN IS TO LEAD AND DIRECT THE ACTIONS OF OTHERS, HE MUST BE EMOTIONALLY STABLE. LACK OF SUCH STABILITY WILL REDUCE HIS CONTROL AND HIS EFFECTIVENESS AS A LEADER, ESPECIALLY IN STRESS SITUATIONS. IN THE PREVIOUS STUDY (53) EMOTIONAL INSTABILITY (CHARACTERIZED BY HYPERTENSION, NERVOUSNESS, EXCITABILITY MANIFESTED OVERTLY BY UNSTEADY HANDS, INABILITY TO SIT STILL, AND SO ON) WAS MEASURED BY A TEST COMPOSED OF ITEMS TAKEN FROM THE PERSONAL INVENTORY DA PRT 2401. THE CORRELATION COEFFICIENT BETWEEN LEADER SCORES ON THIS DIMENSION AND THE LEADER'S FIELD PERFORMANCE SCORE WAS $-.28$ (THE LOWER THE INSTABILITY SCORE, THE HIGHER THE PERFORMANCE SCORE). IN THE PRESENT STUDY, A SIMILAR SET OF ITEMS WAS USED TO MEASURE THIS TRAIT.

(4) PHYSICAL PROWESS (VARIABLE 8). LEADERS WHO HAVE CONFIDENCE IN THEIR MANLY CAPABILITIES, AND WHO LIKE ACTIVITIES INVOLVING PHYSICAL SKILL AND EXERTION, SHOULD PERFORM BETTER IN THE PHYSICALLY DEMANDING ACTIVITIES OF COMBAT AND OF THE FIELD PROBLEM. A MEASURE OF THIS VARIABLE WAS CONSTRUCTED FROM ITEMS IN PRT 2401. AVERAGE SQUAD SCORES WERE PREVIOUSLY FOUND (53) TO CORRELATE SIGNIFICANTLY WITH FIELD PERFORMANCE SCORES.

(5) SOCIAL ACTIVENESS (VARIABLE 9). IT IS REASONABLE TO ASSUME THAT THE EXTENT TO WHICH THE SQUAD LEADER ENGAGES IN OR SEEKS SOCIAL ACTIVITY WITHIN THE ARMY STRUCTURE IS RELATED TO HIS ABILITY TO WORK EFFECTIVELY

AS A LEADER. WORKING ON THIS ASSUMPTION, A SET OF ITEMS WAS DRAWN FROM PRT 2401. AVERAGE SQUAD SCORES WERE SIGNIFICANTLY CORRELATED WITH PERFORMANCE SCORES IN THE PREVIOUS STUDY (53).

(6) JOB ADJUSTMENT. MEN WHO RESENT MILITARY SERVICE, DISAGREE WITH THE GOALS OF THE MILITARY, OR ARE RELUCTANT TO SERVE IN COMBAT AREAS OR IN COMBAT TYPE JOBS, MAY BE LIKELY TO PERFORM THEIR MILITARY DUTIES LESS WELL THAN THOSE MEN WHO LIKE THEIR JOBS AND WHOSE THINKING IS IN ACCORD WITH THE OBJECTIVES OF THE MILITARY ORGANIZATION. TWO PREDICTOR MEASURES WERE USED TO TAP THIS SET OF GENERAL ATTITUDES:

(A) GENERAL ARMY ADJUSTMENT (VARIABLE 10). A SET OF ITEMS DESIGNED TO MEASURE GENERAL ADJUSTMENT TO MILITARY LIFE WAS DEVELOPED AND ADMINISTERED TO SQUAD LEADERS IN THE PREVIOUS STUDY (53). THE CORRELATION COEFFICIENT BETWEEN LEADER SCORES ON THESE ITEMS AND LEADER SCORES ON THE FIELD PROBLEM WAS .41, ONE OF THE HIGHEST COEFFICIENTS FOUND IN THAT STUDY. A NUMBER OF ITEMS WERE AGAIN USED IN THE PRESENT STUDY.

(B) PREFERENCE FOR FIGHTING JOBS (VARIABLE 11). THE BETTER LEADERS, IT WAS HYPOTHESIZED, SHOULD HAVE STRONGER PREFERENCES FOR FIGHTING JOBS (AS OPPOSED TO CIVILIAN TYPE OR NONFIGHTING JOBS) THAN THE POORER LEADERS. THIS HYPOTHESIS WAS CHECKED WITH A TEST COMPOSED OF A NUMBER OF ITEMS SIMILAR TO THOSE USED IN A STUDY OF FIGHTERS AND NONFIGHTERS IN KOREA.

(7) NONCOGNITIVE CHARACTERISTICS (ARMY PICTURE TEST, DA PRT 2606, VARIABLE 12). THIS TEST IS DESIGNED TO MEASURE A NUMBER OF NONCOGNITIVE CHARACTERISTICS HYPOTHESIZED TO BE RELATED TO EFFECTIVE MILITARY PERFORMANCE.

2. MEMBERS

A. ABILITIES. THE SKILLS AND ABILITIES WHICH SQUAD MEMBERS POSSESS MAY ALSO CONTRIBUTE IMPORTANTLY TO SQUAD SUCCESS IN FIELD PERFORMANCE.

THREE SUCH PREDICTOR VARIABLES WERE INCLUDED IN THIS STUDY:

(1) GENERAL ABILITY: APTITUDE AREA I SCORES (VARIABLE 13). THE REASONING BEHIND THE USE OF THIS VARIABLE HAS ALREADY BEEN DISCUSSED ABOVE FOR THE SQUAD LEADER. SCORES WERE OBTAINED FROM FORMS 20 FOR ALL SQUAD MEMBERS. MEMBERS' SCORES WERE ADDED TO OBTAIN A SCORE FOR EACH SQUAD.

(2) BASIC MILITARY PROFICIENCY TEST (VARIABLE 14). THIS TEST, ALSO DISCUSSED PREVIOUSLY, WAS ADMINISTERED TO ALL SQUAD MEMBERS. THE SQUAD SCORE WAS THE SUM OF INDIVIDUAL SQUAD MEMBER SCORES.

(3) MARKSMAN QUALIFICATION SCORES (VARIABLE 15). THESE SCORES WERE OBTAINED FROM EACH MAN'S MARKSMANSHIP QUALIFICATION RECORD. SCORES WERE ADDED FOR ALL SQUAD MEMBERS. THE RELATIONSHIP BETWEEN MARKSMANSHIP AND PERFORMANCE ON THE LIVE FIRING PROBLEM IS OBVIOUS. HOWEVER, ADMINISTRATIVE RECORDS OF THIS SORT HAVE OFTEN BEEN FOUND TO BE UNRELIABLE.

B. PERSONALITY CHARACTERISTICS. FIVE OF THE PERSONALITY MEASURES CONSIDERED FOR THE SQUAD LEADER WERE ALSO INCLUDED FOR SQUAD MEMBERS:

PHYSICAL PROWESS (VARIABLE 16), SOCIAL ACTIVENESS (VARIABLE 17), PERIPHERAL NERVOUSNESS (VARIABLE 18), GENERAL ARMY ADJUSTMENT (VARIABLE 19), AND THE MEASURE OF PREFERENCE FOR FIGHTING JOBS (VARIABLE 20).

C. BIOGRAPHICAL CHARACTERISTICS. A NUMBER OF BIOGRAPHICAL MEASURES WERE AVAILABLE FROM FORMS 20 OF THE SQUAD MEMBERS TESTED IN THIS STUDY. TWO SUCH ITEMS, AGE (VARIABLE 21) AND EDUCATIONAL LEVEL (VARIABLE 22), WERE OBTAINED FOR ALL SQUADS. AS A GENERAL HYPOTHESIS, IT WAS PRESUMED THAT SQUADS COMPOSED OF YOUNGER AND BETTER EDUCATED MEN WOULD DO BETTER ON THE FIELD PERFORMANCE CRITERIA.

D. INTERPERSONAL RELATIONSHIPS

FOR A RIFLE SQUAD TO BECOME AN EFFECTIVE TEAM, IT IS ASSUMED THAT THE MEMBERS OF A SQUAD MUST PRACTICE AND WORK TOGETHER AS A TEAM--BE AN "INTEGRAL" UNIT.

1. LEADER-MEMBER RELATIONSHIPS

THE LEADER IS A PIVOTAL MAN IN SQUAD PERFORMANCE. CONSEQUENTLY, THE

NETWORK OF RELATIONSHIPS BETWEEN THE LEADER AND THE SQUAD MEMBERS MAY BE A MOST IMPORTANT PART OF THE TOTAL NETWORK OF INTRASQUAD RELATIONSHIPS. MEASURES OF FOUR TYPES OF VARIABLE⁴ RELATING TO LEADER-MEMBER RELATIONSHIPS WERE INCLUDED IN THIS STUDY.

A. INTERPERSONAL PREFERENCES (SOCIOMETRIC INSTRUMENTS, VARIABLES 23, 24, AND 25). THE EMOTIONAL TIES EXISTING BETWEEN THE SQUAD LEADER AND HIS MEN, AND THE TIES AMONG THE MEN, SHOULD AFFECT THE MANNER AND THE SUCCESS WITH WHICH THEY PERFORM THEIR TEAM DUTIES AND ACCOMPLISH SQUAD MISSIONS. MEASURES OF SUCH INTERPERSONAL TIES, CALLED SOCIOMETRIC MEASURES, HAVE SHOWN GREAT PROMISE IN PREDICTING GROUP EFFECTIVENESS. FOR EXAMPLE, VERY DIFFERENT PATTERNS OF EMOTIONAL TIES HAVE BEEN FOUND (12) BETWEEN COMMANDING OFFICERS AND FLIERS IN EFFECTIVE AND INEFFECTIVE SQUADRONS. IN THE FIRST STUDY OF THIS SERIES (29), CONDUCTED WITH SCOUT SQUADS OF THE ARMORED RECONNAISSANCE PLATOON (LIGHT), SUCH A SOCIOMETRIC MEASURE WAS CORRELATED SIGNIFICANTLY WITH SQUAD PERFORMANCE ON A FIELD PROBLEM CRITERION. A REVISED VERSION OF THIS SAME MEASURE WAS AGAIN USED IN THE PREVIOUS STUDY (53); A NUMBER OF DIFFERENT SCORES DERIVED FROM THE INSTRUMENT FAILED TO CORRELATE WITH SQUAD CRITERION SCORES. HOWEVER, FURTHER ANALYSIS OF THESE SCORES SHOWED THAT FOR THE 33 TESTED SQUADS WHO HAD HIGHEST SQUAD INTEGRALITY SCORES, THERE WAS A SIGNIFICANT CORRELATION BETWEEN SQUAD PERFORMANCE SCORES AND SEVERAL SCORES DERIVED FROM THE SOCIOMETRIC MEASURE (8). ON THE BASIS OF THIS CONFLICTING BUT PROMISING EVIDENCE, A NINE-ITEM REVISED VERSION OF THIS SOCIOMETRIC MEASURE WAS USED IN THE PRESENT STUDY, AND SCORES REFLECTING BOTH LEADER-MEMBER AND MEMBER-MEMBER RELATIONSHIPS WERE OBTAINED FOR USE AS PREDICTORS OF SQUAD FIELD PERFORMANCE.

B. KNOWLEDGE OF FELLOW SQUAD MEMBERS³(VARIABLES 26-29). THOUGH THE ROLES OF SQUAD LEADER AND OF SQUAD MEMBERS ARE DEFINED IN CONSIDERABLE DETAIL BY THE ARMY, THERE ARE STILL CONSIDERABLE DIFFERENCES IN THE MANNER IN WHICH THESE ROLES ARE PLAYED. DIFFERENCES IN CARRYING OUT THESE ROLES ARISE, IN PART, FROM INDIVIDUAL DIFFERENCES AMONG SQUAD MEMBERS. IT WAS REASONED THAT, FOR A SQUAD TO FUNCTION EFFECTIVELY AS A TEAM, IT IS IMPORTANT FOR SQUAD MEMBERS, AND ESPECIALLY FOR THE SQUAD LEADER, TO KNOW THE ROLE BEHAVIORS OF THEIR TEAMMATES. THE LEADER AND MEMBERS NEED TO KNOW WHO IN THE SQUAD CAN BEST SOLVE A PARTICULAR SQUAD PROBLEM AND WHAT TO EXPECT OF EACH OTHER IN CRITICAL ACTIONS. BY KNOWING WHAT THE OTHER MAN WILL DO, EACH MAN CAN BETTER GUIDE HIS OWN ACTIONS; AND THE SQUAD WILL THUS BE MORE EFFECTIVE ON FIELD PROBLEMS AND IN COMBAT. THE HYPOTHESIS THAT EFFECTIVE LEADERS ARE MORE ACCURATE IN THEIR ESTIMATES OF GROUP MEMBERS WAS FIRST EXPLORED BY CHOWDHRY AND NEWCOMB (3). NEGATIVE EVIDENCE ON THIS HYPOTHESIS HAS BEEN FOUND BY HITES AND CAMPBELL (10), AND POSITIVE EVIDENCE IN THIS AREA HAS BEEN FOUND IN PREVIOUS STUDIES OF THIS SERIES (9, 54).

ALTHOUGH KNOWLEDGE ABOUT FIELD BEHAVIOR MAY BE THE MOST IMPORTANT FOR FIELD PROBLEM PERFORMANCE, IT IS REASONABLE TO ASSUME THAT THERE IS SOME GENERALITY OF KNOWLEDGE--SQUAD MEMBERS WHO CAN ACCURATELY ANTICIPATE OTHER SQUAD MEMBER'S BEHAVIOR IN OTHER THAN FIELD SITUATIONS ARE MORE LIKELY TO ACCURATELY ANTICIPATE THEIR BEHAVIOR IN THE FIELD. IT WAS FOUND PREVIOUSLY (54) THAT SQUADS WHOSE MEMBERS COULD ACCURATELY ESTIMATE POPULARITY OF FELLOW SQUAD MEMBERS PERFORMED SIGNIFICANTLY BETTER ON THE FIELD PROBLEM THAN THOSE WHO WERE LESS ACCURATE IN THIS RESPECT. THIS RELATIONSHIP WAS EVEN CLOSER FOR SQUAD LEADERS. ON THE BASIS OF THIS EVIDENCE AND THE ABOVE REASONING, THE FOLLOWING PROCEDURES WERE USED IN THE PRESENT STUDY. EACH SQUAD MEMBER WAS ASKED TO NOMINATE THE THREE HIGHEST AND THREE LOWEST SQUAD

MEMBERS ON EACH OF FOUR CHARACTERISTICS:

- (1) POPULARITY
- (2) INTELLIGENCE
- (3) THOUGHT NEATEST BY SQUAD
- (4) THOUGHT BEST COMBAT SOLDIER BY SQUAD

THESE NOMINATIONS WERE COMPARED WITH MORE OBJECTIVE MEASURES OF THE ATTRIBUTES: FOR POPULARITY, SOCIOMETRIC CHOICES WERE USED; INTELLIGENCE, APTITUDE AREA I SCORES; AND THE SQUAD CONSENSUS OF RATINGS ON NEATNESS AND COMBAT SOLDIER-LINESS. ALL FOUR WERE USED FOR VARIABLE 26, THE FIRST TWO FOR VARIABLE 27, AND THE LAST TWO FOR VARIABLE 28.

LEADERS AND MEN WERE ALSO ASKED TO PREDICT THEIR SQUAD'S RATINGS ON ITEMS FROM THE DAYLIGHT BLANK FIRING PROBLEM--FIVE SQUAD LEADER ITEMS AND FIVE SQUAD MEMBER ITEMS. DISCREPANCIES BETWEEN PREDICTIONS AND ACTUAL RATINGS BY THE UMPIRES WERE COMPUTED (VARIABLE 29).

THUS, SCORES WERE AVAILABLE FOR BOTH LEADERS AND MEMBERS ON THEIR KNOWLEDGE OF FELLOW SQUAD MEMBERS IN BOTH NONTACTICAL AND TACTICAL AREAS. IT WAS HYPOTHESIZED THAT ACCURACY OF PREDICTING OTHER'S RESPONSES WOULD INCREASE THE EFFECTIVENESS OF SQUAD FIELD PERFORMANCE. VARIABLES 26-29 WERE THE KNOWLEDGEABILITY SCORES OF THE SQUAD LEADERS.

C. MEMBERS' PERCEPTIONS OF SQUAD LEADER BEHAVIOR. ANOTHER CRUCIAL ASPECT OF LEADER-MEMBER RELATIONS WITHIN THE SQUAD IS THE WAY IN WHICH SQUAD MEMBERS PERCEIVE THE BEHAVIOR OF THEIR LEADER. THREE MEASURES OF THE WAY SQUAD MEMBERS PERCEIVE THEIR LEADER WERE USED:

(1) SQUAD LEADER ROLE DISCREPANCY (VARIABLE 30). LEADERS BEHAVE IN DIFFERING WAYS TOWARD THEIR MEN. SQUAD MEMBERS EXPECT THEIR LEADER TO ACT IN CERTAIN WAYS. SQUAD LEADERS WHO PLAY THEIR LEADER ROLES IN A WAY

WHICH MEETS MEMBERS' EXPECTATIONS MAY BE MORE SUCCESSFUL IN ELICITING EFFECTIVE TEAMWORK AND COOPERATION FROM THEIR MEN. IN THE PREVIOUS STUDY (54), A SET OF ITEMS WAS SCORED IN TERMS OF DISCREPANCY BETWEEN SQUAD MEMBERS' PERCEPTIONS OF IDEAL SQUAD LEADER BEHAVIOR AND THEIR PERCEPTIONS OF THEIR OWN SQUAD LEADER'S BEHAVIOR. THESE SCORES DISCRIMINATED SIGNIFICANTLY BETWEEN LEADERS OF HIGH AND LOW SCORING SQUADS. THE ITEMS WERE REVISED FOR GROUP ADMINISTRATION.

(2) SQUAD LEADER AS A PROBLEM SOLVER (VARIABLE 31). TO DO HIS JOB, THE SQUAD LEADER MUST MAKE DEMANDS ON HIS MEN; HE MUST IN A SENSE SET PROBLEMS FOR THEM. A GOOD SQUAD LEADER NOT ONLY SETS UP PROBLEMS FOR HIS MEN, BUT HELPS THEM TO SOLVE THEIR PROBLEMS. IF SQUAD MEMBERS PERCEIVE THEIR LEADER AS A MAN WHO SOLVES THEIR PROBLEMS, THEY MAY MORE WILLINGLY SUBMIT TO HIS CONTROL AND WORK MORE WILLINGLY WITH HIM AS AN EFFECTIVE TEAM. A SET OF ITEMS DESIGNED TO MEASURE SQUAD MEMBERS' PERCEPTIONS OF THEIR LEADER AS AN EFFECTIVE PROBLEM SOLVER WAS USED SUCCESSFULLY IN A PREVIOUS STUDY (54). THESE ITEMS WERE REVISED FOR GROUP ADMINISTRATION.

(3) EVALUATION OF SQUAD LEADER BY SQUAD MEMBERS (VARIABLE 32). THE PREVIOUS STUDY SHOWED THAT A SINGLE ITEM--MEASURING SQUAD MEMBER SATISFACTION WITH THEIR SQUAD LEADER--DIFFERENTIATED SIGNIFICANTLY BETWEEN HIGH AND LOW SCORING SQUADS. IN THE PRESENT STUDY, ITEMS WERE INCLUDED TO MEASURE THE SATISFACTION OF SQUAD MEMBERS WITH THEIR SQUAD LEADER.

D. LEADER-MEMBER TEAMWORK (FIELD PROBLEM CHECKLIST, INSTRUMENT O). THERE ARE DIFFERENCES IN THE WAY LEADERS FULFILL THEIR ROLES AS LEADERS. ON THE BASIS OF OBSERVATIONS OF SQUADS IN THE FIELD, IT WAS THOUGHT THAT CERTAIN NONTACTICAL ASPECTS OF LEADER-MEMBER INTERACTIONS IN THE FIELD WOULD BE RELATED TO THE TACTICAL EFFECTIVENESS OF THE SQUAD. TO TEST THIS

HYPOTHESIS, A CHECKLIST OF NONTACTICAL BEHAVIOR WAS CONSTRUCTED AND A PAIR OF OBSERVERS RATED 24 OF THE TESTED SQUADS DURING THEIR FIELD TESTS. RATINGS OF THE TWO OBSERVERS WERE AVERAGED. FROM THE CHECKLIST, THREE SUBSCORES WERE DERIVED, TWO OF WHICH ARE APPROPRIATE AS LEADER-MEMBER RELATIONSHIP VARIABLES:

(1) LEADER BEHAVIOR OF THE SQUAD LEADER IN SITUATIONS FOR WHICH THE ARMY DOES NOT SPECIFY THE CORRECT BEHAVIOR (VARIABLE 33). ITEMS OF THIS SCALE WERE ON THE WAY IN WHICH THE SQUAD LEADER GAVE HIS ORDERS (MANNER, CLARITY, CONFIDENCE), WHETHER HE CRITICALLY REVIEWED THE SQUAD PERFORMANCE AT PAUSES DURING THE FIELD PROBLEM, AND SO ON.

(2) MUTUAL CORRECTIVE FACTOR (VARIABLE 34). THIS VARIABLE REFERS TO HOW WELL THE SQUAD MEMBERS HELP OUT THE SQUAD LEADER AND EACH OTHER IN SITUATIONS FOR WHICH THE ARMY DOES NOT SPECIFICALLY DIRECT SUCH ACTION, AND TO WHAT EXTENT THE SQUAD LEADER TAKES ADVANTAGE OF THE BRAINS OF HIS ENTIRE SQUAD, AND NOT JUST HIS OWN, IN PLANNING AND DIRECTING SQUAD ACTIONS. ITEMS OF THIS SCALE RATED THE EXTENT TO WHICH SQUAD MEMBERS ASKED QUESTIONS AND THE EXTENT TO WHICH THEY HELPED EACH OTHER AND THE SQUAD LEADER DURING FIELD PROBLEMS.

2. MEMBER-MEMBER RELATIONSHIPS.

ALTHOUGH CONSIDERABLE STRESS HAS BEEN PLACED UPON LEADER-MEMBER RELATIONSHIPS, THE INTERPERSONAL RELATIONSHIPS AMONG SQUAD MEMBERS ALSO PLAY A MAJOR PART IN DETERMINING THE FIELD EFFECTIVENESS OF THE SQUAD. THE MAJOR VARIABLES INVESTIGATED IN THIS AREA WERE:

A. INTERPERSONAL PREFERENCES AMONG SQUAD MEMBERS

(1) SOCIOMETRIC SCORES. SOCIOMETRIC MEASURES WERE DISCUSSED UNDER LEADER-MEMBER RELATIONSHIPS. IN ADDITION TO THESE MEASURES, THE SOCIOMETRIC DEVICE INCLUDED IN THIS STUDY WAS SCORED IN TWO WAYS FOR MEMBER-MEMBER

RELATIONSHIPS: (A) POSITIVE PLUS NEGATIVE CHOICES WITHIN THE SQUAD (VARIABLE 35), CONSIDERED AS AN INDEX OF THE CONCERN SQUAD MEMBERS HAVE FOR EACH OTHER (IRRESPECTIVE OF FEELING TONE) OR AS AN INDICATION OF THE INTENSITY OF SQUAD MEMBER INTERACTIONS; AND (B) TOTAL POSITIVE CHOICES WITHIN SQUAD (VARIABLE 36), CONSIDERED AS A MEASURE OF HOW WELL SQUAD MEMBERS LIKE EACH OTHER OR HOW COHESIVE THE SQUAD IS. IN BOTH CASES, THE GENERAL PREDICTION WAS THAT THE GREATER THE NUMBER OF CHOICES, THE HIGHER WOULD BE THE FIELD PERFORMANCE SCORE.

(2) HYPOTHETICAL SQUAD NOMINATIONS. IT IS COMMONLY BELIEVED THAT A PERSON WORKS BETTER WHEN IN A WORK GROUP COMPOSED OF PEOPLE HE LIKES AND RESPECTS. IN THE PREVIOUS STUDY (54), SQUAD MEMBERS WERE TOLD TO MAKE UP A HYPOTHETICAL RIFLE SQUAD WHICH WOULD BE EFFECTIVE ON FIELD PROBLEMS, BY SELECTING MEN FROM THEIR COMPANY FOR EACH SQUAD POSITION. THREE MEASURES WERE DERIVED FROM THESE RESPONSES: NUMBER OF MEN FROM THE RESPONDENT'S OWN SQUAD WHOM HE SELECTED FOR HIS HYPOTHETICAL SQUAD (VARIABLE 37), NUMBER OF MEN SELECTED FOR THEIR OWN SQUAD POSITIONS IN THE HYPOTHETICAL SQUAD (VARIABLE 38), AND NUMBER OF MEN SELECTED FOR DIFFERENT SQUAD POSITIONS IN THE HYPOTHETICAL SQUAD (VARIABLE 39). ALL THREE OF THESE MEASURES DISCRIMINATED SIGNIFICANTLY BETWEEN HIGH AND LOW SCORING SQUADS. THIS INSTRUMENT WAS MODIFIED FOR GROUP ADMINISTRATION AND THE SAME THREE MEASURES WERE DERIVED.

(3) PREFERENCES FOR WORKING WITH MEN FROM OWN SQUAD (VARIABLE 40). A SET OF ITEMS WAS CONSTRUCTED ASKING SQUAD MEMBERS TO CHOOSE BETWEEN THEIR OWN SQUAD MATES AND OTHER MEN IN THE COMPANY AS CO-WORKERS IN EACH OF FIVE SPECIFIC TASKS. THIS MEASURE, LIKE THE OTHERS OF THIS AREA, ATTEMPTS TO TAP THE COHESIVENESS OR INTEGRALITY OF THE SQUAD WHICH STEMS FROM THE ATTRACTION OF SQUAD MEMBERS FOR THEIR SQUAD MATES. THE GENERAL HYPOTHESIS IS THAT

THE MORE POSITIVE THE FEELING BETWEEN SQUAD MEMBERS, THE MORE EFFECTIVELY THEY WORK AS A TEAM IN FIELD TESTS.

B. KNOWLEDGE OF FELLOW SQUAD MEMBERS (VARIABLES 41-44). THIS GROUP OF MEASURES WAS DISCUSSED UNDER LEADER-MEMBER RELATIONSHIPS. THE SAME REASONING APPLIES AS TO THE IMPORTANCE OF SQUAD MEMBERS BEING ABLE TO ACCURATELY ANTICIPATE THE RESPONSES OF THEIR SQUAD MATES AND THEIR LEADER IN CRITICAL SITUATIONS. SCORES ON THE KNOWLEDGEABILITY MEASURES WERE ADDED FOR ALL SQUAD MEMBERS TO OBTAIN A SQUAD KNOWLEDGEABILITY SCORE, AND THE SAME GENERAL PROPOSITION THAT KNOWLEDGEABILITY SCORES WOULD BE RELATED TO FIELD PERFORMANCE SCORES WAS HYPOTHESIZED.

E. GROUP-DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS

AFTER A GROUP OF MEN HAS LIVED AND WORKED TOGETHER IN CLOSE INTERACTION, THE GROUP AS SUCH OFTEN BECOMES AN EFFECTIVE FORCE IN MODIFYING AND CONTROLLING THE BEHAVIOR OF THE INDIVIDUAL MEN WHO COMPOSE IT. IN A SENSE, THE STRENGTH AND DIRECTION OF THIS FORCE ARE THE RESULTANTS OF THE INTERACTIONS WITHIN THE GROUP DISCUSSED IN THE PREVIOUS SECTION.

HOWEVER, IT IS NOT GOOD, FROM THE POINT OF VIEW OF CRITERION PERFORMANCE, TO HAVE A THOROUGHLY HAPPY AND COHESIVE GROUP WHICH IS NEVERTHELESS NEGATIVELY ORIENTED TOWARD THE OBJECTIVES WHICH THE ARMY HAS SET FOR IT. FOR EFFECTIVE GROUP PERFORMANCE ON THE FIELD PROBLEM AND IN COMBAT, THE SQUAD MUST JIBE WITH THAT OF THE MILITARY ORGANIZATION, AND THE SQUAD'S SOCIAL NORMS MUST EXERT THEIR INFLUENCE ON SQUAD MEMBERS SO THAT THEY ARE MORE STRONGLY MOTIVATED TO DO WELL IN THE TACTICAL MISSIONS REQUIRED. SEVERAL ATTEMPTS WERE MADE TO TAP THIS AREA BY ASSESSING THE STRENGTH AND DIRECTION OF GROUP-GOAL ORIENTATION WHICH THE LEADER AND MEMBERS POSSESS.

1. PRIDE IN UNITS (VARIABLE 45). IT IS COMMON BELIEF THAT UNITS WHOSE MEMBERS HAVE PRIDE IN THE UNIT OR ESPRIT-DE-CORPS FIGHT BETTER THAN UNITS

WHOSE MEMBERS LACK THIS ESPRIT. SUCH A QUALITY IS INTANGIBLE AND DIFFICULT TO MEASURE. INDIRECT INDEXES OF THIS CHARACTERISTIC CAN BE DEDUCED FROM SUCH MEASURES AS THE SOCIOMETRIC TEST AND THE HYPOTHETICAL SQUAD NOMINATIONS-- THAT IS, FROM SUMMATING INTERPERSONAL PREFERENCES WITHIN THE SQUAD. IT SEEMED FRUITFUL TO ATTEMPT, HOWEVER, TO MEASURE GROUP COHESIVENESS MORE DIRECTLY IN TERMS OF INDIVIDUAL PRIDE IN UNIT MEMBERSHIP IRRESPECTIVE OF ATTRACTIONS FOR INDIVIDUAL SQUAD MATES, THAT IS, COHESIVENESS STEMMING FROM THE UNIT AS A UNIT AND NOT FROM INDIVIDUAL MEMBERS. RESPONSES TO QUESTIONS DESIGNED TO MEASURE INDIVIDUAL PRIDE IN SQUAD MEMBERSHIP DISCRIMINATED SIGNIFICANTLY BETWEEN HIGH AND LOW SCORING SQUADS IN A PREVIOUS STUDY (54). A SET OF SIMILAR QUESTIONS, MODIFIED FOR GROUP ADMINISTRATION, WERE USED IN THE PRESENT STUDY.

2. LEADER VARIABLES

A. REFERENCE GROUP MEASURES (VARIABLES 46 AND 47). A MAN WHO IS HIGHLY ATTRACTED TO A GROUP MAY USE THAT GROUP AND ITS ATTITUDES AS POINTS OF REFERENCE FOR HIS OWN BEHAVIOR, EXPECTATIONS, AND ASPIRATIONS. IT MAY ONLY BE WHEN THE INDIVIDUAL MAN HAS MADE THE STANDARDS AND EXPECTATIONS OF THE GROUP HIS OWN THAT THE POTENTIAL FORCE OF A COHESIVE GROUP CAN BE EFFECTIVE. THE CONCEPT OF REFERENCE GROUP WAS FIRST ELABORATED BY HYMAN (11) AND HAS SINCE BEEN USED EXTENSIVELY BY SHERIF (23, 24), NEWCOMB (20), AND MERTON AND KITT (18). AN INDIVIDUAL SQUAD MEMBER COULD ORIENT HIS FIELD PERFORMANCE AND OTHER ARMY BEHAVIOR TOWARD ONE OR MORE OF AT LEAST THREE MAJOR REFERENCE GROUPS: HIS OWN SQUAD, THE ARMY, OR THE CIVILIAN COMMUNITY. IF A SQUAD MEMBER IDENTIFIES HIMSELF WITH THE GOALS AND STANDARDS OF HIS SQUAD AND OF THE ARMY, HIS MOTIVATION TO DO WELL IN THE FIELD MIGHT BE INCREASED.

TO ASSESS THE DIRECTION OF SUCH GROUP-GOAL ORIENTATION, ITEMS WERE CONSTRUCTED TO TAP THE EXTENT TO WHICH THE SQUAD LEADER AND THE SQUAD

MEMBERS ORIENTED THEIR BEHAVIOR IN TERMS OF THE SQUAD AND IN TERMS OF THE ARMY AS REFERENCE GROUPS.

B. LIKING FOR FIELD PROBLEMS. IN ADDITION TO ASSESSING THE DIRECTION OF GOAL ORIENTATION IN TERMS OF THE INFLUENCE OF VARIOUS REFERENCE GROUPS, IT SEEMED REASONABLE TO ATTEMPT A DIRECT ASSESSMENT OF THE MOTIVATION OF THE INDIVIDUAL MAN FOR PERFORMANCE IN FIELD PROBLEMS. FOR THIS PURPOSE, A SET OF CARTOONS, DEPICTING SIX TYPES OF ARMY JOB ASSIGNMENTS (INCLUDING FIELD PROBLEMS), WAS DEVELOPED AND USED IN THE PREVIOUS STUDY. MEASURES DERIVED FROM THESE CARTOONS SUCCESSFULLY DISCRIMINATED BETWEEN HIGH AND LOW SCORING SQUADS IN A PREVIOUS STUDY (54). THE CARTOON TEST WAS MODIFIED FOR GROUP ADMINISTRATION. EACH MAN WAS ASKED TO RANK ORDER THE CARTOONS IN TERMS OF HIS PREFERENCE FOR THE TYPE OF WORK ASSIGNMENT WHICH EACH CARTOON DEPICTED. THREE SCORES WERE DERIVED FROM THOSE PREFERENCES: (1) EACH MAN'S RANK FOR THE FIELD PROBLEM CARTOON (VARIABLE 48) (2) RANK ATTRIBUTED TO THE SQUAD FOR THE FIELD PROBLEM CARTOON (VARIABLE 49) (3) SELF-SQUAD RANK DISCREPANCY. IN ADDITION TO RANKING THE CARTOONS, MEN WERE ASKED TO RATE EACH CARTOON ON A 5-POINT SCALE. THE PRODUCT OF THE RANK (WHERE HIGHEST RANK IS ASSIGNED HIGHEST NUMBER) AND THE RATING FOR THE FIELD PROBLEM CARTOON WAS COMPUTED (VARIABLE 50). THE GENERAL HYPOTHESIS WAS THAT THE HIGHER ONE'S OWN RANKING OF THE FIELD PROBLEM CARTOON, THE HIGHER THE ATTRIBUTED SQUAD RANKING, AND THE HIGHER THE PRODUCT OF RANK AND RATING, THE MORE GROUP-GOAL ORIENTED THE INDIVIDUAL MAN, AND THEREFORE THE MORE EFFECTIVELY HE WOULD PERFORM ON THE FIELD PROBLEMS.

3. MEMBER VARIABLES.

THE REFERENCE GROUP MEASURES (VARIABLES 51 AND 52) AND THE LIKING FOR FIELD PROBLEM MEASURES (VARIABLES 54-56) DISCUSSED ABOVE FOR THE SQUAD

LEADER WERE ALSO OBTAINED FOR SQUAD MEMBERS, AND THE SCORES OF SQUAD MEMBERS WERE ADDED TO PRODUCE SQUAD SCORES ON EACH OF THE MEASURES. AN ADDITIONAL MEASURE OBTAINED FROM THE CARTOON INSTRUMENT WAS THE SELF-SQUAD DISCREPANCIES IN CARTOON RANKING, DUMMED FOR ALL NINE MEN. THIS MEASURE DISCRIMINATED SIGNIFICANTLY BETWEEN HIGH AND LOW SCORING SQUADS IN A PREVIOUS STUDY (54). TWO OTHER GROUP-GOAL ORIENTATION MEASURES WERE INCLUDED FOR SQUAD MEMBERS:

A. LEVEL OF ASPIRATION FOR THE SQUAD (VARIABLE 53). ITEMS WERE CONSTRUCTED TO MEASURE THE LEVEL OF ASPIRATION WHICH INDIVIDUAL SQUAD MEMBERS HOLD FOR THE SQUAD. THE GENERAL HYPOTHOSIS TO BE TESTED WAS THAT THE HIGHER THE MEMBERS' LEVEL OF ASPIRATION FOR THE SQUAD, THE MORE MOTIVATED THEY WOULD BE TO WORK TOWARD THE SQUAD'S GOALS, AND THE MORE EFFECTIVELY THEY WOULD PERFORM ON THE FIELD PROBLEMS.

B. MOTIVATION SUBSCORE, FIELD PROBLEM CHECKLIST (VARIABLE 58). THE INSTRUMENT WAS DISCUSSED IN THE PREVIOUS SECTION; THE OTHER TWO SUBSCORES DERIVED FROM THE CHECKLIST ARE MEASURES OF LEADER-MEMBER RELATIONSHIPS. THIS THIRD SUBSCORE IS AN ATTEMPT TO MEASURE SQUAD MEMBER MOTIVATION TOWARD THE GROUP-GOAL OF EFFECTIVE FIELD PERFORMANCE BY DIRECT OBSERVATION OF MEMBER BEHAVIOR DURING THE FIELD PROBLEM. THE ITEMS INCLUDED IN THIS SUBSCORE COVER SUCH THINGS AS THE EXTENT TO WHICH SQUAD MEMBERS ACT ALERTLY RATHER THAN JUST GO THROUGH THE MOTIONS DURING A FIELD PROBLEM.

CHAPTER V

VALIDATION OF PREDICTOR INSTRUMENTS

A. INTRODUCTION

THIS CHAPTER PRESENTS THE RESULTS OBTAINED FROM ANALYSES OF RELATIONSHIPS BETWEEN SCORES ON THE PREDICTORS DISCUSSED IN CHAPTER IV AND SCORES ON THE CRITERION FIELD TESTS DISCUSSED IN CHAPTERS II AND III. RESULTS ARE PRESENTED IN THE ORDER IN WHICH THE PREDICTORS ARE DISCUSSED IN CHAPTER IV.

1. RESULTS OF THIS STUDY COMPARED WITH RESULTS OF PREVIOUS STUDIES

AS STATED EARLIER, MANY OF THE PREDICTOR MEASURES USED WERE ADAPTATIONS OF MEASURES THAT HAD BEEN USED IN THE PREVIOUS STUDIES. WHILE IT IS INSTRUCTIVE TO COMPARE PREDICTOR-CRITERION RELATIONSHIPS FOUND IN THIS WITH THOSE FOUND IN THE EARLIER STUDIES, THIS CANNOT BE CONSIDERED A CROSS VALIDATION OF THE RESULTS OF THE PREVIOUS STUDY FOR SEVERAL REASONS. A NUMBER OF PREDICTORS HAVE BEEN FURTHER REFINED, THE CRITERION THIS TIME WAS MORE COMPREHENSIVE, AND QUESTIONS AND TECHNIQUES USED IN THE PREVIOUS STUDY HAD TO BE MODIFIED FOR GROUP ADMINISTRATION. HOWEVER, WHEN A PREDICTOR-CRITERION RELATIONSHIP WAS FOUND TO BE SIGNIFICANT IN BOTH THE CURRENT AND THE PREVIOUS STUDY (53), THIS IS SUPPORTING EVIDENCE THAT A TRUE RELATIONSHIP EXISTS.

2. USES OF THE THREE CLASSES OF PREDICTORS

VARIABLES WERE OF THREE TYPES: INDIVIDUAL, INTERPERSONAL RELATIONSHIP, AND GROUP-DERIVED MOTIVATION. THE SUCCESSFUL PREDICTORS OF THE FIRST TYPE ARE OF IMMEDIATE USE, SINCE THEY CAN BE APPLIED BEFORE SQUADS ARE FORMED. VARIABLES OF THE SECOND AND THIRD TYPES CAN ONLY BE USEFUL AFTER SQUADS HAVE BEEN FORMED AND SO CANNOT BE USED TO ASSIGN MEN TO UNITS. THEIR VALUE LIES IN THE BETTER UNDERSTANDING THEY PROVIDE REGARDING HOW GROUPS OPERATE.

3. COMPUTATION OF GROUP MEASURES.

FOR MANY OF THE PREDICTOR VARIABLES USED, SCORES OF ALL SQUAD MEMBERS WERE ADDED TO OBTAIN A GROUP SCORE CHARACTERISTIC OF THE SQUAD AS A WHOLE. CHARACTERIZING A GROUP IN TERMS OF DESCRIPTIVE STATISTICS WAS ONLY A FIRST STEP: USE OF PATTERN ANALYSIS AND OTHER ANALYTIC TECHNIQUES WOULD PROVIDE A MORE COMPREHENSIVE PICTURE. HOWEVER, IT WAS NOT FEASIBLE IN THIS STUDY TO INTENSIVELY ANALYZE THE HUNDREDS OF PREDICTOR-CRITERION RELATIONSHIPS AVAILABLE. CONSEQUENTLY, THE FIRST-STEP ANALYSIS WAS PERFORMED, SO THAT FURTHER ANALYSES COULD BE PERFORMED LATER ON THOSE PREDICTOR VARIABLES WHICH THE PRELIMINARY ANALYSIS SHOWED TO BE PROMISING.

4. CRITERIA FOR EVALUATION OF PREDICTORS.

TWELVE SEPARATE, THOUGH INTERRELATED, CRITERION MEASURES WERE AVAILABLE (SEE END OF CHAPTER II). INASMUCH AS COMPOSITE SCORES FROM ALL THREE PROBLEMS PROVIDED MORE COMPREHENSIVE INDEXES OF SQUAD EFFECTIVENESS THAN SCORES FROM ANY SINGLE PROBLEM, THESE COMPOSITE SCORES WERE USED TO VALIDATE PREDICTORS. THREE SUCH COMPOSITE SCORES WERE AVAILABLE: A SQUAD LEADER SCORE, A SQUAD MEMBER SCORE, AND A SQUAD SCORE (THE WEIGHTED AVERAGE OF THE FIRST TWO). IN GENERAL, THE COMPOSITE SQUAD LEADER SCORE (LEADER CRITERION SCORE) WAS USED TO VALIDATE LEADER PREDICTOR VARIABLES; THE COMPOSITE SQUAD MEMBER SCORE (MEMBER CRITERION SCORE) WAS USED TO VALIDATE MEASURES OF INDIVIDUAL SQUAD MEMBER CHARACTERISTICS AND INTERACTIONS; AND THE COMPOSITE SQUAD SCORE (SQUAD CRITERION SCORE) WAS USED AS THE CRITERION FOR THE COMPUTATION OF THE MULTIPLE CORRELATION DISCUSSED IN SECTION B OF THIS CHAPTER. SINCE ALL PREDICTIONS ARE UNIDIRECTIONAL, ONE-TAILED TESTS OF SIGNIFICANCE WERE USED.

5. ORGANIZATION OF THIS CHAPTER

DISCUSSION OF THE PREDICTOR VARIABLES FOLLOWS THE SEQUENCE LAID OUT IN CHAPTER IV; SECTION B DISCUSSES INDIVIDUAL CHARACTERISTICS, SECTION C INTERPERSONAL RELATIONSHIPS, AND SECTION D GROUP-DERIVED SOURCES OF MOTIVATION TOWARD ARMY-DEFINED GOALS. WITH EACH OF THESE SECTION IS A TABLE (TABLES 7, 9, AND 10) OF CORRELATION COEFFICIENTS BETWEEN THE PREDICTORS AND APPROPRIATE CRITERION MEASURES.

B. INDIVIDUAL CHARACTERISTICS (TABLE 7)

1. LEADER VARIABLES

A. ABILITIES. THE MEASURES OF SQUAD LEADER ABILITIES PROVED TO SUCCESSFUL IN PREDICTING SQUAD LEADER FIELD PERFORMANCE: APTITUDE AREA I SCORES (VARIABLE 1), THE RIFLE SQUAD LEADER TEST (VARIABLE 2), MILITARY PROFICIENCY TEST (VARIABLE 3).

APTITUDE AREA I SCORES, THE MEASURE OF LEARNING ABILITY, CORRELATED HIGHLY WITH BOTH OF THE SUCCESSFUL SPECIFIC-ABILITY PREDICTORS; IT CORRELATED MORE HIGHLY WITH THE MORE GENERAL BMPT (.79) THAN WITH THE MORE JOB-SPECIFIC RIFLE SQUAD LEADER TEST (.67) AS WOULD BE EXPECTED. THESE TWO SPECIFIC-ABILITY MEASURES INTERCORRELATED .41, INDICATING THAT TO SOME EXTENT THE TWO TESTS WERE MEASURING DIFFERENT ABILITIES. WHEN THE APTITUDE AREA I SCORE WAS PARTIALLED OUT, THE CORRELATION COEFFICIENT BETWEEN THE RIFLE SQUAD LEADER TEST AND THE LEADER CRITERION WAS .39.

THE COEFFICIENT OF .58 BETWEEN RIFLE SQUAD LEADER TEST SCORES AND SQUAD LEADER PERFORMANCE SCORES WAS HIGHER THAN THE EQUIVALENT COEFFICIENT FOUND IN THE PREVIOUS STUDY (.38). THE IMPROVEMENT CAN BE TRACED TO REFINEMENT OF THE RIFLE SQUAD LEADER TEST AND TO THE MORE COMPREHENSIVE CRITERION USED IN THIS STUDY. IT WILL ALSO BE NOTED THAT SQUAD LEADER SCORES ON THIS TEST

PREDICTED BOTH SQUAD PERFORMANCE (.49) AND SQUAD LEADER PERFORMANCE (.58). THESE RESULTS AND THE EASE OF ADMINISTRATION, SIMPLICITY, AND FACE VALIDITY OF THE RIFLE SQUAD LEADER TEST SUGGEST THE USE OF THIS TEST IN SELECTING SQUAD LEADERS AND EVALUATING SQUAD LEADER PROFICIENCY.

ALTHOUGH TACTICAL AGGRESSIVENESS SCORES (VARIABLE 4) FAILED TO CORRELATE SIGNIFICANTLY WITH THE COMPOSITE LEADER CRITERION SCORES, FURTHER ANALYSIS SHOWED THAT THEY CORRELATED .20 WITH THE LEADER SCORES ON THE LIVE FIRING PROBLEM--THE FIELD PROBLEM CALLING FOR THE MOST ACTIVE AND AGGRESSIVE LEADERSHIP. WHILE IT IS BELIEVED THAT CERTAIN BASIC SKILLS UNDERLIE THE ABILITY TO PERFORM MOST DUTIES, HERE MAY BE A SKILL OR ATTRIBUTE WHICH IS SPECIFIC TO SPECIAL TYPES OF SITUATIONAL REQUIREMENTS.

B. PERSONALITY CHARACTERISTICS.

SEVERAL OF THE MEASURES OF LEADER PERSONALITY CHARACTERISTICS WERE CORRELATED SIGNIFICANTLY WITH LEADER CRITERION SCORES--VARIABLES 5, 7, 8, AND 10. MEASURES OF THESE CHARACTERISTICS WERE ALSO CORRELATED SIGNIFICANTLY WITH PERFORMANCE MEASURES IN THE PREVIOUS STUDY. THE RESULTS OBTAINED IN BOTH STUDIES SUPPORT THE HYPOTHESIS THAT PERSONALITY CHARACTERISTICS ARE RELATED TO LEADER FIELD PERFORMANCE.

2. MEMBER VARIABLES

A. ABILITIES. SQUAD MEMBER'S SCORES ON APTITUDE AREA I (VARIABLE 13), BASIC MILITARY PROFICIENCY TEST (VARIABLE 14), AND MARKSMANSHIP QUALIFICATION (VARIABLE 15) WERE SIGNIFICANTLY RELATED TO THE CRITERIA. THESE RESULTS MAY BE ATTRIBUTABLE TO THE FACT THAT THE SQUAD LEADER'S SCORES WERE INCLUDED IN SQUAD TOTALS. HOWEVER, WHEN THE TOTALS OF APTITUDE AREA I SCORES FOR ALL SQUAD MEMBERS EXCEPT THE LEADER WERE CORRELATED WITH THE CRITERION, THE CORRELATION COEFFICIENT WAS STILL SIGNIFICANT (.19).

TABLE 7

INDIVIDUAL CHARACTERISTIC VARIABLES: MEANS, STANDARD DEVIATIONS, AND C

<u>VARIABLE NUMBER</u>	<u>MEASURE</u>	<u>MAN OR MEN ON WHOM TAKEN¹</u>	<u>INSTRUMENT²</u>	<u>ITEMS³</u>	<u>MEAN</u>
1	APTITUDE AREA I (CODED SCORES)	1	FORM 20	--	3.4
2	RIFLE SQUAD LEADER TEST	1	G (CRT 77)	(54)	28.7
3	BASIC MILITARY PROFICIENCY TEST	1	C (PRT 2687, FORM A)	(94)	58.2
4	TACTICAL AGGRESSIVENESS	1	N (CRT 336)	4-9	5.8
5	LEVEL OF ASPIRATION FOR SELF	1	I (CRT 328AA)	55-64	25.5
6	ASSUMED SIMILARITY	1	M (CRT 331)	(27)	31.4
7	PERIPHERAL NERVOUSNESS SCALE (CRT 337)	1	B (CRT 320)	(21)	14.3
8	PHYSICAL PROWESS SCALE (CRT 339)	1	B (CRT 320)	(52)	34.9
9	SOCIAL ACTIVENESS SCALE (CRT 340)	1	B (CRT 320)	(37)	27.0
10	GENERAL ARMY ADJUSTMENT SCALE (CRT 338)	1	B (CRT 320)	(46)	29.5
11	PREFERENCE FOR FIGHTING JOBS	1	I (CRT 326AA)	1-27	50.8
12	ARMY PICTURE TEST	1	A (PRT 2606, FORM I)	(180)	45.8
13	APTITUDE AREA I (CODED VALUES)	1-9	FORM 20	--	27.9
14	BASIC MILITARY PROFICIENCY TEST	1-9	C (PRT 2687 FORM A)	(94)	489.4
15	MARKSMANSHIP QUALIFICATION SCORES (CODED SCORES)	1-9	FORM 20	--	22.7
16	PHYSICAL PROWESS SCALE (CRT 339)	1-9	B (CRT 320)	(52)	289.0
17	SOCIAL ACTIVENESS SCALE (CRT 340)	1-9	B (CRT 320)	(37)	224.1
18	PERIPHERAL NERVOUSNESS SCALE (CRT 337)	1-9	B (CRT 320)	(21)	119.4
19	GENERAL ARMY ADJUSTMENT SCALE (CRT 338)	1-9	B (CRT 320)	(46)	249.5
20	PREFERENCE FOR FIGHTING JOBS	1-9	H, I (CRT 326 A, AA)	1-27	418.0
21	AGE (CODED VALUES)	1-9	FORM 20	--	19.1
22	EDUCATIONAL LEVEL (CODED VALUES)	1-9	FORM 20	--	29.2

¹ THESE NUMBERS CORRESPOND TO T/O DESIGNATIONS; THE SQUAD LEADER IS THE #1 MAN.

² THESE INSTRUMENTS AND THEIR SCORING KEYS ARE REPRODUCED IN APPENDIX II (CODE LETTER I

³ NUMBERS IN PARENTHESES ARE THE NUMBER OF ITEMS IN THE INSTRUMENT WHEN ALL ITEMS ARE I

⁴ UNDERLINED CORRELATION COEFFICIENTS ARE TESTS OF HYPOTHESES DEVELOPED IN THIS STUDY.

TABLE 7

DEVIATIONS, AND CORRELATION COEFFICIENTS WITH COMPOSITE CRITERIA

EMS ³	MEAN	S.D.	CORRELATION ⁴ WITH COMPOSITE CRITERIA		
			LEADER CRITERION	MEMBER CRITERION	SQUAD CRITERION
-	3.4	1.3	<u>.55*</u>		.48*
54)	28.7	7.4	<u>.58*</u>		.49*
94)	58.2	10.9	<u>.48*</u>		
-9	5.8	1.5	<u>.03</u>		-.01
5-64	25.5	5.8	<u>.23*</u>		.18*
27)	31.4	14.9	<u>.15</u>		.12
21)	14.3	2.7	<u>.27*</u>		.24*
52)	34.9	6.3	<u>.17*</u>		
37)	27.0	4.8	<u>.15</u>		
46)	29.5	3.7	<u>.32*</u>		.29*
-27	50.8	16.3	<u>.05</u>		.02
180)	45.8	5.3	<u>.11</u>		
-	27.9	4.4			<u>.34*</u>
94)	489.4	41.2		.37*	<u>.18*</u>
-	22.7	5.7		<u>.17*</u> (LIVE)	
52)	289.0	25.2			<u>.13</u>
37)	224.1	13.2			<u>.18*</u>
21)	119.4	9.2			<u>.12</u>
46)	249.5	13.3			<u>.14</u>
1-27	418.0	57.0		<u>.05</u>	.09
--	19.1	3.0		<u>.08</u>	.11
--	29.2	3.4		<u>.24*</u>	.19*

HE #1 MAN.

11 (CODE LETTER USED IN APPENDIX IS USED HERE).

EN ALL ITEMS ARE USED.

ED IN THIS STUDY.

*SIGNIFICANT AT THE 5% LEVEL.

THE FACT THAT MEASURES OF MEMBER ABILITIES DID NOT CONTRIBUTE MUCH TO PREDICTION OF PROBLEM SCORES SHOWS AGAIN THAT MERELY AVERAGING THE SCORES OF EIGHT MEN DOES NOT MAKE FOR EFFECTIVE PREDICTION. HOWEVER, ONE SALIENT POINT WAS NOTED BY OBSERVERS DURING THE FIELD TESTS: SQUADS DID NOT EFFECTIVELY UTILIZE THE INTELLIGENCE THEY HAD. IN COMPARATIVELY FEW OF THE SQUADS DID THE MEMBERS HELP THE LEADER PLAN THE MISSIONS AND MAKE DECISIONS. IN VERY FEW INSTANCES DID THE LEADER CALL ON THE MEN FOR ASSISTANCE. IN GENERAL, THE MEN SAT AND WAITED TO BE TOLD WHAT TO DO; THEY MERELY PERFORMED THEIR DUTIES AS RIFLEMEN.

B. PERSONALITY CHARACTERISTICS. THE CORRELATION COEFFICIENT BETWEEN SOCIAL ACTIVENESS (VARIABLE 17) AND THE CRITERION WAS SIGNIFICANT. MEASURES OF THIS VARIABLE CORRELATED SIGNIFICANTLY WITH PERFORMANCE IN THE PREVIOUS STUDY.

C. BIOGRAPHICAL CHARACTERISTICS. MEAN EDUCATIONAL LEVEL (VARIABLE 22) OF SQUAD MEMBERS WAS SIGNIFICANTLY CORRELATED (.24) WITH MEMBER CRITERION SCORES. HOWEVER, WHEN APTITUDE AREA 1 SCORES WERE PARTIALED OUT, THIS COEFFICIENT WAS NO LONGER SIGNIFICANT.

3. MULTIPLE CORRELATION

SINCE THE INDIVIDUAL CHARACTERISTIC VARIABLES (OBTAINABLE BEFORE MEN ARE ASSIGNED TO SQUADS) COULD BE OF USE IN SELECTION AND ASSIGNMENT, THEIR PREDICTIVE EFFICIENCY IN TERMS OF MULTIPLE CORRELATION WAS CONSIDERED. THE FOLLOWING PROCEDURE WAS USED. SQUAD LEADER VARIABLES (1-12) WERE SEPARATED FROM VARIABLES OBTAINED BY ADDING SCORES OF ALL NINE SQUAD MEMBERS (13-22).¹ THIS WAS DONE IN ORDER TO ASSESS SEPARATELY THE CONTRIBUTIONS OF THE LEADER

¹ VARIABLE 15 (MARKSMANSHIP QUALIFICATION SCORES) WAS OMITTED SINCE THE COMPOSITE SQUAD SCORE IS NOT AN APPROPRIATE CRITERION FOR IT. AGE AND EDUCATION (VARIABLES 21 AND 22) WERE ALSO OMITTED.

AND THE MEMBER VARIABLES TO SQUAD CRITERION SCORES. CORRELATION COEFFICIENTS BETWEEN EACH OF THE VARIABLES AND THE SQUAD CRITERION WERE COMPUTED, USING HALF OF THE TOTAL SAMPLE (THE ODD-NUMBERED 56 SQUADS).

NONE OF THE SQUAD MEMBER VARIABLES (13-20) PRODUCED VALIDITY COEFFICIENTS GREATER THAN .18; SO NO FURTHER ATTEMPT WAS MADE TO OBTAIN A MULTIPLE R BASED UPON SQUAD MEMBER VARIABLES.

THE DWYER SQUARE ROOT TEST SELECTION TECHNIQUE WAS USED TO OBTAIN A MULTIPLE R BETWEEN THE SQUAD LEADER VARIABLES AND THE COMPOSITE SQUAD CRITERION FOR THE ODD-NUMBERED 56 SQUADS.¹ THE INTERCORRELATIONS, CORRELATIONS WITH COMPOSITE SQUAD CRITERION, AND BETA WEIGHTS² FOR THE SQUAD LEADER VARIABLES ARE PRESENTED IN TABLE 8.

THE MULTIPLE R OBTAINED FROM THE ODD-NUMBERED SQUADS WAS .54. USING THE REGRESSION EQUATION BASED UPON THE BETA WEIGHTS OF THE ODD-NUMBERED 56 SQUADS, (APTITUDE AREA I, BASIC MILITARY PROFICIENCY TEST, PERIPHERAL NERVOUSNESS) THE CRITERION SCORES OF THE 56 EVEN-NUMBERED SQUADS WERE PREDICTED. THESE PREDICTED SCORES WERE THEN CORRELATED WITH THE ACTUAL CRITERION SCORES. THE RESULTING CROSS-VALIDITY COEFFICIENT WAS .47, INDICATING THAT SUBSTANTIAL AND STABLE PREDICTION OF CRITERION SCORES CAN BE MADE.

1 EXCLUDED FROM THE MATRIX ARE VARIABLES 4 AND 11, WHICH CORRELATED LESS THAN .10 WITH THE CRITERION IN BOTH ODD AND EVEN SAMPLES.

2 ONLY THOSE VARIABLES CORRELATING .10 OR HIGHER WITH THE CRITERION WERE USED IN THE TEST SELECTION TECHNIQUE.

TABLE 8

CORRELATION ANALYSIS OF INDIVIDUAL CHARACTERISTICS OF SQUAD LEADERS*

VARIABLE NUMBER	INTERCORRELATIONS									CORRELATION WITH CRITERION	BETA WEIGHTS
	2	3	5	6	7	8	9	10	12		
1**	.70	.60	.23	-.07	.36	-.04	.26	.39	.17	.52	.413
2**		.72	.33	-.19	.26	.10	.23	.47	.11	.35	
3**			.31	.09	.48	.27	.36	.52	.17	.41	.106
5				.14	.20	.24	.23	.27	.23	-.03	
6					.23	.08	.13	.05	.17	-.12	
7**						.37	.47	.42	.16	.32	.116
8							.42	.25	.33	.00	
9								.35	.36	.08	
10**									.04	.24	
12										-.03	

* BASED ON 56 ODD-NUMBERED SQUADS

** VARIABLE USED IN DWYER SQUARE ROOT TEST SELECTION METHOD

C. INTERPERSONAL RELATIONSHIPS WITHIN THE SQUAD (TABLE 9)

1. LEADER-MEMBER RELATIONSHIPS

THE ASSUMED SIMILARITY MEASURE (VARIABLE 25) WAS USED AS A PERSONALITY MEASURE OF THE SQUAD LEADER. IN 36 OF THE 112 SQUADS, THE SQUAD LEADER RECEIVED MORE POSITIVE NOMINATIONS ON THE SOCIOMETRIC INSTRUMENT THAN ANY OTHER SQUAD MEMBER. WHEN A COEFFICIENT WAS COMPUTED FOR JUST THESE 36 SQUAD LEADERS, IT WAS .33, WHICH IS SIGNIFICANT AT THE 5% LEVEL.

KNOWLEDGEABILITY OF THE LEADER (VARIABLES 26-29) WAS SIGNIFICANTLY CORRELATED WITH THE SQUAD CRITERION SCORES. THESE RESULTS INDICATE THE IMPORTANCE OF THE SQUAD LEADER KNOWING THE SOCIAL STRUCTURE OF HIS SQUAD AND THE CAPABILITIES AND PREFERENCES OF HIS MEN. SINCE SIGNIFICANT RESULTS IN THIS AREA WERE ALSO FOUND PREVIOUSLY (9, 21, 54), THE HYPOTHESIS IS TENABLE THAT SQUAD LEADERS WHO ARE MORE ACCURATE IN ESTIMATING THE RESPONSES OF THEIR MEN ARE MORE EFFECTIVE FIELD LEADERS.

IN AREA OF SQUAD MEMBERS' PERCEPTIONS OF THE SQUAD LEADER, SQUAD LEADER ROLE DISCREPANCY SCORES (VARIABLE 30) WERE CONSISTENTLY CORRELATED WITH CRITERION SCORES. THE RESULTS SUGGEST THAT IT MAY BE IMPORTANT FOR SQUAD LEADERS TO FULFILL THE EXPECTATIONS OF THEIR MEN IN PLAYING THEIR ROLES AS LEADERS.

TWO OF THE THREE SCORES DERIVED FROM THE HYPOTHETICAL SQUAD NOMINATIONS (VARIABLES 37 AND 38) WERE SIGNIFICANTLY CORRELATED WITH CRITERION SCORES. ALL THREE SCORES CORRELATED SIGNIFICANTLY IN THE PREVIOUS STUDY.

MEASURES OF THE ACCURACY OF ESTIMATING TEAMMATES' RESPONSES (VARIABLES 41-43) FOR SQUAD MEMBERS PROVED MORE EFFECTIVE IN PREDICTING SQUAD CRITERION SCORES THAN DID THESE SAME MEASURES (VARIABLES 26-29) FOR THE SQUAD LEADER. WHEN THE MOST COMPREHENSIVE KNOWLEDGEABILITY SCORE (VARIABLE 41) WAS CORRELATED WITH THE MOST COMPREHENSIVE CRITERION SCORE. (THE SQUAD CRITERION

TABLE 9

INTERPERSONAL RELATIONSHIPS VARIABLES: MEANS, STANDARD DEVIATIONS, AND CORRELATION COEFFICIENTS WITH COMPOSITE CRITERIA

VARIABLE NUMBER	MEASURE	MAN OR MEN ON WHOM TAKEN	INSTRUMENT ²	ITEMS ³	MEAN	S.D.	CORRELATION ⁴ WITH COMPOSITE CRITERIA		
							LEADER CRITERION	MEMBER CRITERION	SQUAD CRITERION
23	POSITIVE SOCIO-METRIC CHOICES GIVEN BY LEADER	I	J (CRT 193)	(9)	42.1	11.6	.09	<u>.10</u>	.08
24	POSITIVE PLUS NEGATIVE SOCIO-METRIC CHOICES RECEIVED BY LEADER	I	J (CRT 193)	(9)	58.7	8.1	.10	<u>.03</u>	.06
25	ASSUMED SIMILARITY WHEN LEADER IS SOCIO-METRIC CHOICE (N = 36)	I	M (CRT 331)	(27)	31.5	16.6	.33*	<u>.26</u>	.28
26	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS	I	E (CRT 333)	PART I: 3, 4, 7, 8	18.7	7.0	.31*	<u>.21*</u>	.26*
27	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS, SUBSCORE A	I	E (CRT 333)	PART I: 3, 4	11.9	4.9	.28*	<u>.15</u>	.21*
28	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS, SUBSCORE B	I	E (CRT 333)	PART I: 7, 8	8.1	4.0	.18*	<u>.21*</u>	.22*
29	KNOWLEDGEABILITY, TACTICAL SITUATIONS	I	E (CRT 333)	PART II: (10)	9.1	2.6	.19*	<u>.20*</u>	.21*
30	SQUAD LEADER ROLE DISCREPANCY	2-9	F (CRT 324A)	33-38	39.1	4.6	.23*	<u>.25*</u>	.25*
31	SQUAD LEADER AS PROBLEM SOLVER	2-9	F (CRT 324A)	72-81	184.6	19.2	.05	<u>.16*</u>	.11
32	EVALUATION OF SQUAD LEADER	2-9	F (CRT 324A)	28-32, 39-54	533.5	61.5	.07	<u>.10</u>	.07
33	LEADERSHIP SUBSCORE, FIELD PROBLEM CHECKLIST (N = 24)	--	O (CRT 334)	1, 2, 3, 10, 14, 17, 18	30.5	10.9	.12	<u>-.15</u>	
34	MUTUAL CORRECTIVE FACTOR SUBSCORE, FIELD PROBLEM CHECKLIST (N = 24)	--	O (CRT 334)	4-9, 19	25.3	7.7		<u>-.14</u>	-.16
35	POSITIVE PLUS NEGATIVE SOCIO-METRIC CHOICES WITHIN SQUAD	1-9	J (CRT 193)	(9)	510.2	56.8		<u>.15</u>	.13
36	POSITIVE SOCIO-METRIC CHOICES WITHIN SQUAD	1-9	J (CRT 193)	(9)	360.8	64.3		<u>.16*</u>	.17*
37	NUMBER OF MEN FROM OWN SQUAD CHOSEN IN ANY POSITION	1-9	D (CRT 332)	--	35.6	9.3		<u>.16*</u>	.19*
38	NUMBER OF MEN FROM OWN SQUAD CHOSEN IN SAME POSITIONS	1-9	D (CRT 332)	--	14.8	7.9		<u>.08</u>	.06
39	NUMBER OF MEN FROM OWN SQUAD CHOSEN IN DIFFERENT POSITIONS	1-9	D (CRT 332)	--	20.8	6.4		<u>.13</u>	.10
40	PREFERENCE FOR WORKING WITH MEN FROM OWN SQUAD	1-9	H, I (CRT 323 A; AA)	77-81	120.6	23.7		<u>.31*</u>	.37*
41	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS	1-9	E (CRT 333)	PART I: 3, 4, 7, 8	189.6	28.5	.37*	<u>.20*</u>	.24*
42	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS, SUBSCORE A	1-9	E (CRT 333)	PART I: 3, 4	106.2	15.3	.26*	<u>.30*</u>	.33*
43	KNOWLEDGEABILITY, NON-TACTICAL SITUATIONS, SUBSCORE B	1-9	E (CRT 333)	PART I: 7, 8	82.4	17.3	.31*	<u>.03</u>	.08
44	KNOWLEDGEABILITY, TACTICAL SITUATIONS	1-9	E (CRT 333)	PART II: (10)	77.0	12.1	.11		

1 THESE NUMBERS CORRESPOND TO T/O DESIGNATIONS; THE SQUAD LEADER IS THE #1 MAN.

2 THESE INSTRUMENTS AND THEIR SCORING KEYS ARE REPRODUCED IN APPENDIX II (CODE LETTER USED IN APPENDIX I IS USED HERE).

3 NUMBERS IN PARENTHESES ARE THE NUMBER OF ITEMS IN THE INSTRUMENT WHEN ALL ITEMS ARE USED.

4 UNDERLINED CORRELATION COEFFICIENTS ARE TESTS OF HYPOTHESES DEVELOPED IN THIS STUDY.

*SIGNIFICANT AT THE 5% LEVEL.

Score), the coefficient was .37. There was some indication that knowledge of squad members' individual characteristics is relatively more important for the leader, and knowledge of the squad's social structure is more important for the members. These results are in line with S.L.A. Marshall's (16) contention that communication among unit members is of utmost importance. The better squad members know each other, the more effectively they can communicate.

D. GROUP-DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS (TABLE 10)

1. LEADER VARIABLES

NONE OF THE MEASURES (VARIABLES 46-50) DESIGNED TO TAP GROUP-DERIVED SOURCES OF SQUAD LEADER MOTIVATION WERE SIGNIFICANTLY CORRELATED WITH CRITERION SCORES.

2. MEMBER VARIABLES

MEMBERS WHO REGARDED THEIR SQUAD AS A REFERENCE GROUP (VARIABLE 51) TENDED TO PERFORM BETTER ON THE CRITERION THAN DID SQUADS WHOSE MEMBERS DID NOT ORIENT THEIR BEHAVIOR WITH REFERENCE TO SQUAD ATTITUDE² AND GOALS. TWO OTHER MEASURES OF GROUP-GOAL ORIENTATION WERE SIGNIFICANTLY CORRELATED WITH SQUAD CRITERION SCORES: PRODUCT OF RANK AND PREFERENCE RATING OF FIELD PROBLEM CARTOON FOR SELF (VARIABLE 56) AND SELF-SQUAD DISCREPANCY IN CARTOON RANKING (VARIABLE 57).

E. SUMMARY

SEVERAL CORRELATIONS WERE FOUND BETWEEN PREDICTOR AND CRITERION SCORES:

SQUAD LEADER ABILITIES, BOTH GENERAL AND SPECIFIC, CORRELATED SIGNIFICANTLY WITH FIELD PERFORMANCE. SOME MEASURES OF SQUAD LEADER MOTIVATION AND PERSONALITY CHARACTERISTICS ALSO SUCCESSFULLY PREDICTED SQUAD LEADER FIELD PERFORMANCE, WHILE SIMILAR MEASURES OF SQUAD MEMBER PERSONALITY CHARACTERISTICS FAILED, WITH ONE EXCEPTION (SOCIAL ACTIVENESS), TO CORRELATE SIGNIFICANTLY WITH CRITERION SCORES.

A MULTIPLE R WAS COMPUTED FOR 56 OF THE SQUADS BETWEEN SELECTED SQUAD LEADER PREDICTOR MEASURES (AVAILABLE BEFORE MEN ARE ASSIGNED TO SQUADS) AND THE SQUAD CRITERION SCORES. THE R WAS ^{.47}~~.24~~ WHEN CROSS-VALIDATED ON THE OTHER 56 SQUADS.

KNOWLEDGEABILITY SCORES FOR THE LEADERS, AND ESPECIALLY FOR SQUAD MEMBERS WERE SIGNIFICANTLY CORRELATED WITH SQUAD EFFECTIVENESS. SO ALSO WERE SQUAD MEMBERS' JUDGMENTS OF DISCREPANCIES IN SQUAD LEADERS' ROLE.

IN THE AREA OF GROUP-DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS, A FEW MEASURES WERE SIGNIFICANTLY CORRELATED WITH FIELD PROBLEM SCORES: REFERENCE GROUP MEASURES FOR SQUAD MEMBERS AND A PATTERN OF GROUP-GOAL ORIENTATION MEASURES FOR SQUAD MEMBERS.

TABLE 10

GROUP-DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS: MEANS, STANDARD DEVIATIONS, AND CORRELATIONS WITH COMPOSITE CRITERIA

VARIABLE NUMBER	MEASURE	MAN OR MEN ON WHOM TAKEN ¹	INSTRUMENT ²	ITEMS	MEAN	S.D.	CORRELATION ³ WITH COMPOSITE CRITERIA		
							LEADER CRITERION	MEMBER CRITERION	SQUAD CRITERION
45	PRIDE IN UNIT	2-9	F (CRT 324A)	13-27	279.4	40.1	.11	<u>.06</u>	
46	SQUAD AS REFERENCE GROUP	I	H (CRT 327A)	28-35	21.2	4.7	<u>.05</u>		.08
47	ARMY AS REFERENCE GROUP	I	H (CRT 327A)	36-43	24.2	7.4	<u>.05</u>		.05
48	RANK OF FIELD PROBLEM CARTOON FOR SELF	I	L (CRT 325)	--	3.2	1.3	<u>.08</u>		.09
49	RANK OF FIELD PROBLEM CARTOON ATTRIBUTED TO SQUAD	I	L (CRT 325)	--	3.3	1.2	<u>-.01</u>		.05
50	PRODUCT OF RANK AND PREFERENCE RATING OF FIELD PROBLEM CARTOON FOR SELF	I	L (CRT 325)	--	11.9	7.3	<u>.12</u>		.14
51	SQUAD AS REFERENCE GROUP	I-9	H, I (CRT 327A, AA)	28-35	174.3	19.2		<u>.18*</u>	.15
52	ARMY AS REFERENCE GROUP	I-9	H, I (CRT 327A, AA)	36-43	187.2	18.7		<u>.04</u>	.01
53	LEVEL OF ASPIRATION FOR SQUAD	I-9	H, I (CRT 328A, AA)	65-68	112.6	9.9		<u>.09</u>	.05
54	RANK OF FIELD PROBLEM CARTOON FOR SELF	I-9	L (CRT 325)	--	30.2	3.9		<u>-.10</u>	-.09
55	RANK OF FIELD PROBLEM CARTOON ATTRIBUTED TO SQUAD	I-9	L (CRT 325)	--	32.8	4.0		<u>.15</u>	.14
56	PRODUCT OF RANK AND PREFERENCE RATING OF FIELD PROBLEM CARTOON FOR SELF	I-9	L (CRT 325)	--	94.2	25.6		<u>.14</u>	.16*
57	PERCEIVED SELF-SQUAD DIFFERENCES IN CARTOON RANKING	I-9	L (CRT 325)	1-6	34.5	11.4		<u>.26*</u>	.23*
58	MOTIVATION SUBSCORE, FIELD PROBLEM CHECKLIST (N = 24)	--	O (CRT 334)	11-13; 15, 16	26.8	5.8		<u>.17</u>	

¹ THESE NUMBERS CORRESPOND TO T/O DESIGNATIONS; THE SQUAD LEADER IS THE #1 MAN.² THESE INSTRUMENTS AND THEIR SCORING KEYS ARE REPRODUCED IN APPENDIX 11 (CODE LETTER USED IN APPENDIX 11 IS USED HERE).³ UNDERLINED CORRELATION COEFFICIENTS ARE TESTS OF HYPOTHESES DEVELOPED IN THIS STUDY.

*SIGNIFICANT AT THE 5% LEVEL.

CHAPTER VI

SUMMARY AND CONCLUSIONS

THIS CHAPTER SUMMARIZES THE RESULTS OF THE ADMINISTRATION OF THE THREE CRITERION FIELD PROBLEMS AND THE EVALUATION OF INSTRUMENTS FOR MEASURING FACTORS RELATED TO SMALL UNIT EFFECTIVENESS. SUGGESTIONS ARE MADE AS TO HOW THE CRITERION INSTRUMENTS DEVELOPED IN THIS STUDY MIGHT BE USED BY OPERATIONAL UNITS.

A. THE CRITERIA AND THEIR USES1. DEVELOPMENT OF CRITERIA

IN ADDITION TO THE DAYLIGHT BLANK FIRING FIELD PROBLEM DEVELOPED IN A PREVIOUS STUDY, A DAYLIGHT LIVE FIRING PROBLEM AND A NIGHT BLANK FIRING PROBLEM WERE DEVELOPED FOR THE RIFLE SQUAD. THESE PROBLEMS WERE DESIGNED TO BE VALID, RELIABLE, AND PRACTICAL FOR OPERATIONAL AS WELL AS FOR RESEARCH USE. ARMY PUBLICATIONS AND ACCOUNTS OF COMBAT ACTIONS WERE REVIEWED AND THE PROBLEMS WERE DEVELOPED COOPERATIVELY WITH MILITARY EXPERTS AT THE INFANTRY SCHOOL TO MAKE SURE THE PROBLEMS DID INCLUDE DUTIES CRITICAL TO COMBAT. PROBLEM MANUALS WERE PREPARED AND USED IN ADMINISTERING THE PROBLEMS.

INTER-UMPIRE AGREEMENT ON THE THREE PROBLEMS WAS SUFFICIENT TO INDICATE THAT THE PROBLEMS HAD HIGH SCORING RELIABILITY AND THAT THEY PROVIDE OBJECTIVE MEASURES OF PERFORMANCE. NONCOMMISSIONED OFFICERS TRAINED BY THE RESEARCH TEAM ADMINISTERED THE PROBLEMS WITH NO SPECIAL DIFFICULTY. THE PROBLEMS DO NOT MAKE EXCESSIVE DEMANDS ON AVAILABLE MANPOWER AND MATERIAL. THUS, THEY ARE PRACTICAL FOR OPERATIONAL USE.

2. MISSIONS INCLUDED IN CRITERIA

EACH FIELD PROBLEM IS INTENDED TO PROVIDE AN ACCURATE MEASURE OF THE

LEVEL OF EFFECTIVENESS OF UNIT PERFORMANCE IN THE THREE BASIC TYPES OF SQUAD ACTIVITY: ATTACK, DEFENSE, AND RECONNAISSANCE. EACH PROBLEM CALLS FOR AND MEASURES PERFORMANCE OF CRITICAL DUTIES SUCH AS PREPARATIONS FOR MISSIONS, CONTROL, ADEQUACY OF SQUAD FIRE, ADEQUACY OF OBSERVATION, USE OF COVER AND CONCEALMENT, ABILITY TO MAINTAIN ORIENTATION ON THE GROUND, AND SO ON. NCO UMPIRES, AFTER BEING TRAINED IN THE ADMINISTRATION OF THE PROBLEM, ADMINISTER THE TESTS. THEY GIVE TACTICAL ORDERS, ACT AS SAFETY OFFICERS, AND RECORD PERFORMANCE ON THE RATING FORMS.

THE DAYLIGHT BLANK FIRING PROBLEM CONSISTS OF FOUR PHASES: SQUAD IN ATTACK, SQUAD IN DEFENSE, SQUAD AS POINT OF AN ADVANCE GUARD, AND SQUAD AS A RECONNAISSANCE PATROL. THE DAYLIGHT LIVE FIRING PROBLEM CONSISTS OF ATTACK, DEFENSE, AND FLANK GUARD PHASES. IT PLACES EMPHASIS UPON MEASUREMENT OF SUCH CHARACTERISTICS OF SQUAD FIRE AS ACCURACY AND DISTRIBUTION, AS WELL AS FIRE CONTROL BY THE SQUAD LEADER. HITS ON TARGETS CONTRIBUTE LARGELY TO THE SQUAD'S SCORE. THE NIGHT PROBLEM COMBINES ATTACK, DEFENSE, AND RECONNAISSANCE DUTIES INTO A COMBAT PATROL MISSION. TAKEN TOGETHER, THESE THREE PROBLEMS PROVIDE A RELATIVELY COMPREHENSIVE TEST OF ABOUT 20 HOURS DURATION. A HIGH SCORE ON THE PROBLEMS INDICATES THAT THE SQUAD CAN EFFICIENTLY PERFORM THOSE DUTIES CRITICAL IN COMBAT SITUATIONS.

3. PROCEDURES FOR CRITERION DEVELOPMENT

THE METHODS FOR FIELD TEST CONSTRUCTION DEVELOPED IN PRIOR RESEARCH AND REPORTED IN PRB REPORT 980 WERE USED SUCCESSFULLY IN THIS STUDY TO DEVELOP THE DAYLIGHT LIVE FIRING AND NIGHT PROBLEMS. THE STATEMENT OF METHODS IS RECOMMENDED TO ARMY AND RESEARCH PERSONNEL RESPONSIBLE FOR THE DEVELOPMENT OF PERFORMANCE TESTS.

4. USES OF THE CRITERIA

THE FIELD PROBLEMS WERE DEVELOPED TO PROVIDE THE ARMY WITH A COMPREHENSIVE SET OF CRITERIA OF RIFLE SQUAD EFFECTIVENESS. THEY CAN BE USED FOR RESEARCH PURPOSES OR BY OPERATIONAL UNITS IN THE FOLLOWING WAYS:

A. THE PROBLEMS CAN BE USED BY HIGHER COMMANDERS TO ESTABLISH NORMS OF COMBAT READINESS FOR RIFLE SQUADS DRAWN FROM DIFFERENT DIVISIONS OR REGIMENTS. THUS, THE PROBLEMS CAN PROVIDE COMMANDERS COMPARABLE MEASURES OF THE OPERATIONAL READINESS OF SMALL UNITS WITHIN THEIR COMMANDS.

B. THE PROBLEMS CAN BE USED ON AN ARMY-WIDE BASIS TO PROVIDE SPECIFIC GOALS OF PERFORMANCE EFFECTIVENESS. SQUADS THAT ACHIEVE A HIGH SCORE CAN BE REWARDED FOR THEIR GOOD PERFORMANCE.

C. THE PROBLEMS CAN BE USED FOR SELECTION AT THE COMPANY OR PLATOON LEVEL. FIELD OBSERVATIONS AND PROBLEM SCORES CAN INDICATE WHICH SQUAD LEADERS HAVE COMMAND PRESENCE, WHICH LEADERS KNOW SQUAD TACTICS, AND WHICH DO NOT. THUS, THE PROBLEMS CAN BE USED TO EVALUATE MEN FOR THE JOB OF SQUAD LEADER. THEY CAN ALSO BE USED TO IDENTIFY PARTICULARLY EFFECTIVE SQUAD LEADERS WHO CAN BE PROMOTED TO POSITIONS OF GREATER RESPONSIBILITY.

D. AS A BY-PRODUCT THE PROBLEMS CAN BE USED TO TRAIN RIFLE SQUADS AND RIFLE SQUAD LEADERS. OBSERVATIONS AND INFORMAL INTERVIEWS WITH MEN BEING TESTED ON THE FIELD PROBLEMS CONFIRMED THEIR TRAINING VALUE. FOR EXAMPLE, THE LIVE FIRING PROBLEM PROVIDED MOST OF THE MEN (WHO HAD BEEN THROUGH SEVERAL TRAINING CYCLES) WITH THEIR FIRST OPPORTUNITY TO MOVE IN A DIAMOND OR COLUMN FORMATION AND TO MANEUVER FROM THESE FORMATIONS INTO A SKIRMISH LINE AND SELECT FIRING POSITION WHILE CARRYING LOADED WEAPONS.

E. UMPIRE'S CHECKS ON THE RATING FORMS CAN PROVIDE AN OBJECTIVE AND THOROUGH ACCOUNT OF TRAINING DEFICIENCIES. CRITIQUES FOR EITHER A

SINGLE SQUAD OR A NUMBER OF SQUADS FROM A COMPANY OR BATTALION CAN BE PREPARED FROM THE RATING FORMS.

F. THE PROBLEMS PROVIDE VALUABLE TRAINING FOR UMPIRES. BY LEARNING TO DISCRIMINATE BETWEEN EFFECTIVE AND INEFFECTIVE PERFORMANCE, AND ASSUMING RESPONSIBILITY FOR THE CONDUCT OF A PROBLEM, UMPIRES INCREASE THEIR KNOWLEDGE OF SMALL UNIT TACTICS AND GAIN COMMAND PRESENCE. HENCE THEY BECOME MORE EFFECTIVE SMALL UNIT LEADERS.

G. THE PROBLEMS CAN BE USED AS CRITERION MEASURES FOR VALIDATING SELECTION AND CLASSIFICATION INSTRUMENTS. BECAUSE OF THEIR COVERAGE OF CRITICAL DUTIES AND STANDARDIZATION, THESE PROBLEMS ARE ESPECIALLY SUITABLE AS RESEARCH CRITERIA.

IT IS EMPHASIZED THAT THE ABOVE BENEFITS ARE POSSIBLE ONLY IF THE PROBLEMS ARE ORGANIZED ACCORDING TO INSTRUCTIONS AND PROPERLY UMPIRED.

B. THE PREDICTORS AND THEIR USES

1. EVALUATION OF THE PREDICTORS

THERE WERE THREE TYPES OF PREDICTOR VARIABLE USED IN THIS STUDY: INDIVIDUAL CHARACTERISTICS, MEASURES OF INTERPERSONAL RELATIONSHIPS, AND MEASURES OF GROUP DERIVED MOTIVATIONS TOWARD ARMY-DEFINED GOALS. THE FIRST TYPE MAY BE USED TO SELECT MEN FOR AND ASSIGNMENT TO SQUADS. THE FOLLOWING PREDICTORS OF THE FIRST TYPE CORRELATED SIGNIFICANTLY WITH CRITERION SCORES. EACH VARIABLE IS NUMBERED TO CORRESPOND WITH THE NUMBER IN TABLE 6 , PAGE 35.

SQUAD LEADER VARIABLES

- (1) APTITUDE AREA I
- (2) RIFLE SQUAD LEADER TEST
- (3) BASIC MILITARY PROFICIENCY TEST
- (5) LEVEL OF ASPIRATION FOR SELF
- (7) PERIPHERAL NERVOUSNESS
- (10) GENERAL ARMY ADJUSTMENT

SQUAD MEMBER VARIABLES

(13) APTITUDE AREA I

A MULTIPLE CORRELATION COEFFICIENT, USING THE DWYER SQUARE ROOT TEST SELECTION TECHNIQUE, WAS COMPUTED, USING THE SQUAD LEADER VARIABLES LISTED ABOVE, ON HALF THE SQUADS. THE MULTIPLE R OBTAINED WAS .54, AND THE CROSS-VALIDATING COEFFICIENT (ON THE OTHER HALF OF THE SQUADS) WAS .47. THE VARIABLES CONTRIBUTING TO THE MULTIPLE R WERE APTITUDE AREA I, BASIC MILITARY PROFICIENCY TEST, AND A MEASURE OF EMOTIONAL STABILITY (PERIPHERAL NERVOUSNESS).

2. OPERATIONAL USE OF PREDICTORS

OF THE THREE VARIABLES WHICH CONTRIBUTED TO THE MULTIPLE R, THE APTITUDE AREA I SCORE, WITH THE HIGHEST BETA WEIGHT, IS DERIVED FROM THE ARMY CLASSIFICATION BATTERY ADMINISTERED TO ALL MEN AT RECEPTION STATIONS. THE BASIC MILITARY PROFICIENCY TEST (PRT 2620) IS CURRENTLY AVAILABLE FOR OPERATIONAL USE, AND ITEMS SIMILAR TO THOSE OF THE PERIPHERAL NERVOUSNESS SCALE ARE INCLUDED IN TEST BATTERIES GIVEN FOR OFFICER CANDIDATE SELECTION AND HAVE BEEN USED TO SELECT MEN FOR LEADERSHIP SCHOOLS. THESE MEASURES ON SQUAD LEADERS ARE QUITE EFFECTIVE IN PREDICTING FIELD PERFORMANCE OF RIFLE SQUADS.

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